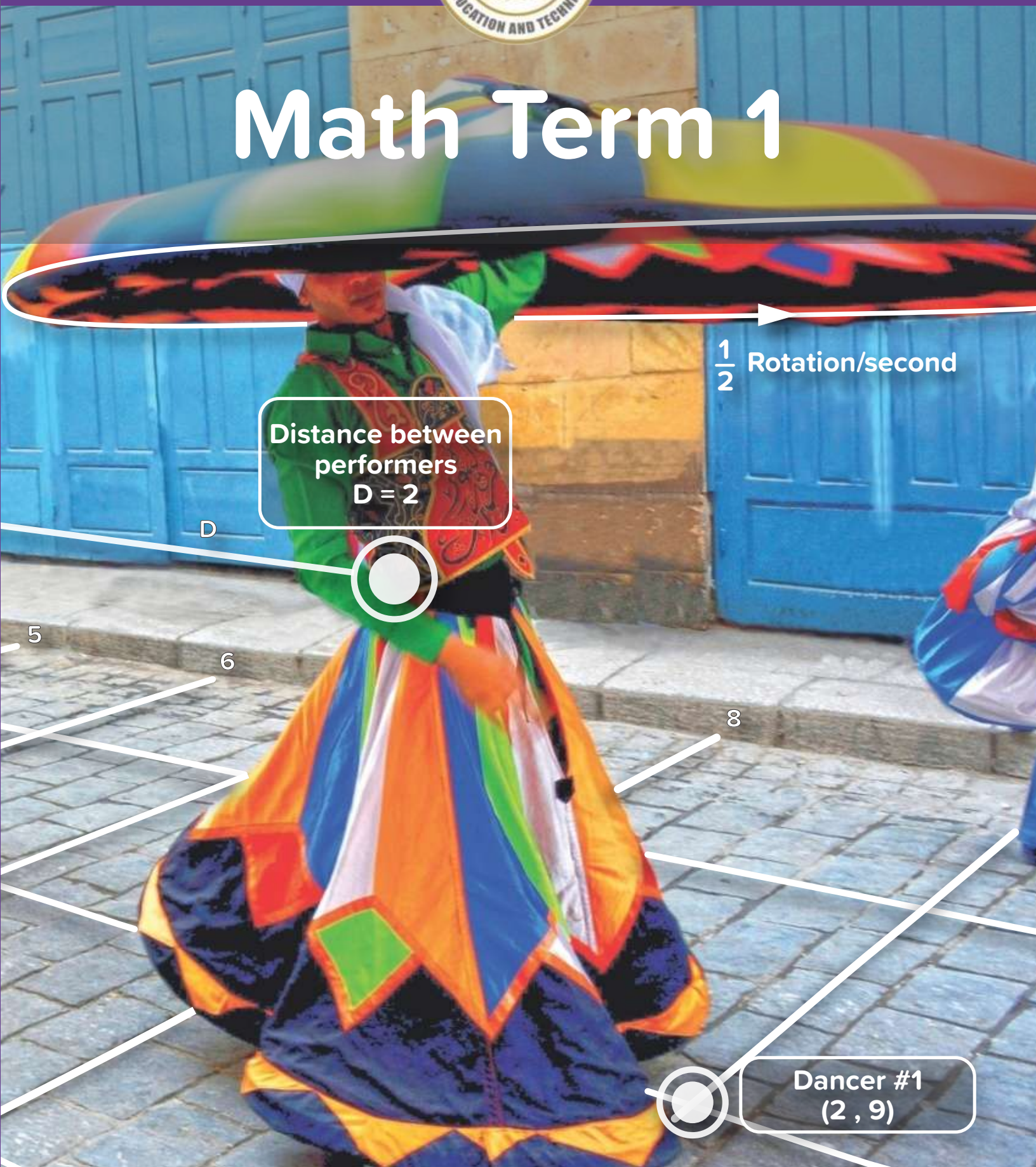
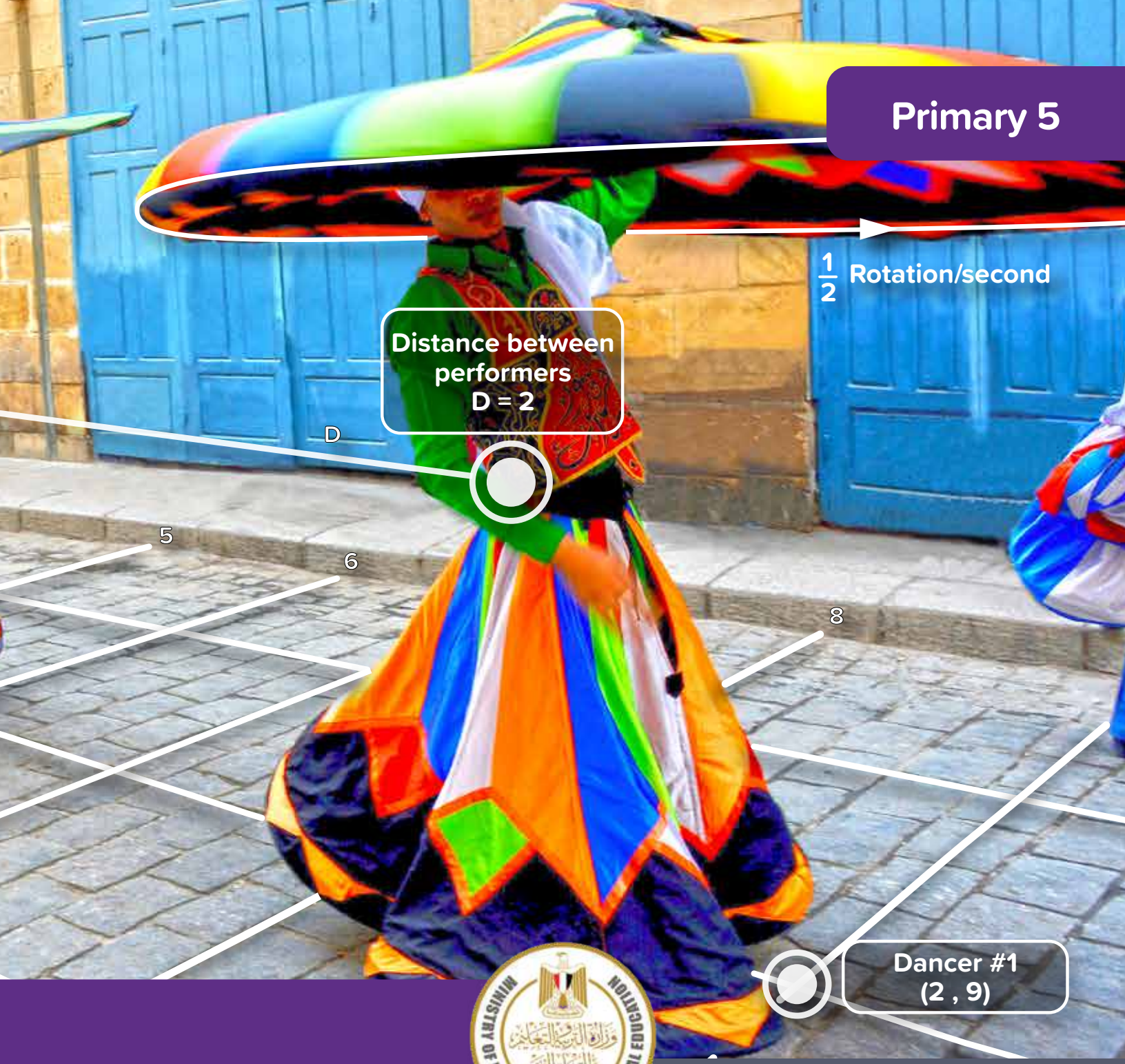
Primary 5
Student Edition
2022–2023

Math Term 1




Primary 5
1/2 Rotation/second
Distance between performers
D = 2
D
5
6
8
Dancer #1
(2 , 9)

Math Term 1



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FOREWORD

This is a pivotal time in the history of the Ministry of Education and Technical Education (MOETE) in Egypt. We are embarking on the transformation of Egypt's K-12 education system. We started in September 2018 with the rollout of KG1, KG2, and Primary 1. In 2021 we rolled out Primary 4, and we will continue with the rollout until 2030. We are transforming the way in which students learn to prepare Egypt's youth to succeed in a future world that we cannot entirely imagine.

MOETE is very proud to present this new series of textbooks, with the accompanying digital learning materials that captures its vision of the transformation journey. This is the result of much consultation, much thought and a lot of work. We have drawn on the best expertise and experience from national and international organizations and education professionals to support us in translating our vision into an innovative national curriculum framework and exciting and inspiring print and digital learning materials.

The MOETE extends its deep appreciation to its own "Center for Curriculum and Instructional Materials Development" (CCIMD) and specifically, the CCIMD Director and her amazing team. MOETE is also very grateful to the minister's senior advisors and to our partners including "Discovery Education," "National Geographic Learning" "Nahdet Masr," "Longman Egypt," UNICEF, UNESCO, and WB, who, collectively, supported the development of Egypt's national curriculum framework. I also thank the Egyptian Faculty of Education professors who participated in reviewing the national curriculum framework. Finally, I thank each and every MOETE administrator in all MOETE sectors as well as the MOETE subject counselors who participated in the process.

This transformation of Egypt's education system would not have been possible without the significant support of Egypt's current president, His Excellency President Abdel Fattah el-Sisi. Overhauling the education system is part of the president's vision of "rebuilding the Egyptian citizen" and it is closely coordinated with the ministries of Higher Education & Scientific Research, Culture, and Youth & Sports. Education 2.0 is only a part in a bigger national effort to propel Egypt to the ranks of developed countries and to ensure a great future to all of its citizens.



WORDS FROM THE MINISTER OF EDUCATION & TECHNICAL EDUCATION

It is my great pleasure to celebrate this extraordinary moment in the history of Egypt where we continue to launch a new education system designed to prepare a new Egyptian citizen proud of his Egyptian, Arab, and African roots—a new citizen who is innovative, a critical thinker, able to understand and accept differences, competent in knowledge and life skills, able to learn for life and able to compete globally.

Egypt chose to invest in its new generations through building a transformative and modern education system consistent with international quality benchmarks. The new education system is designed to help our children and grandchildren enjoy a better future and to propel Egypt to the ranks of advanced countries in the near future.

The fulfillment of the Egyptian dream of transformation is indeed a joint responsibility among all of us; governmental institutions, parents, civil society, private sector and media. Here, I would like to acknowledge the critical role of our beloved teachers who are the role models for our children and who are the cornerstone of the intended transformation.

I ask every one of us to join hands towards this noble goal of transforming Egypt through education in order to restore Egyptian excellence, leadership and great civilization.

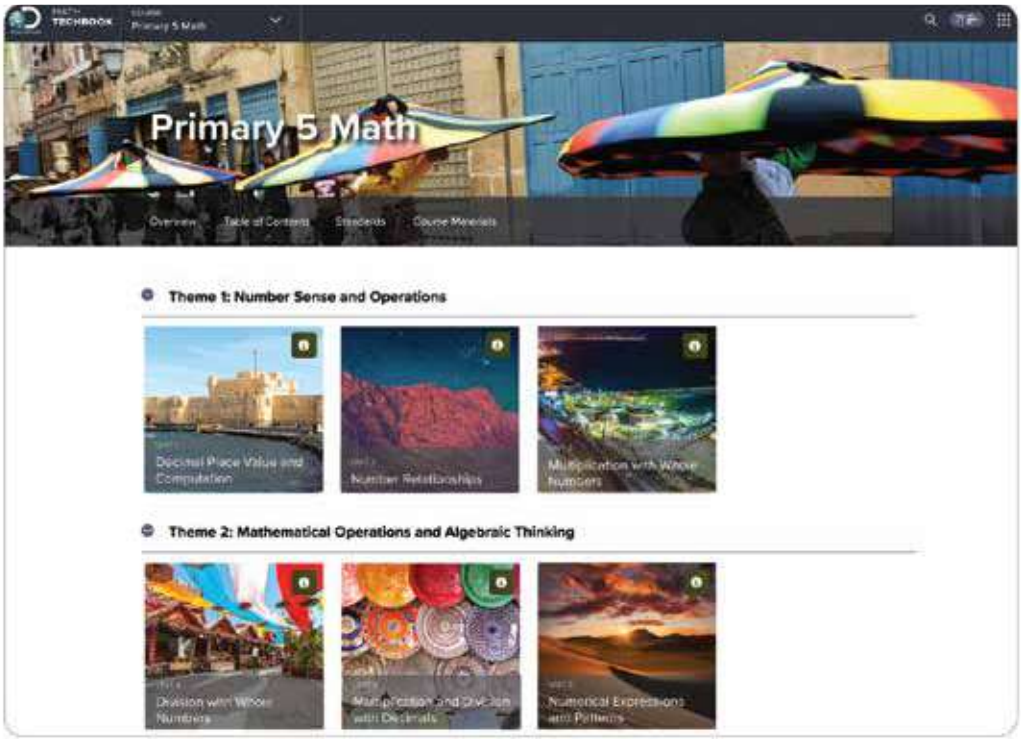
My warmest regards to our children who will begin this journey and my deepest respect and gratitude to our great teachers.

Dr. Tarek Galal Shawki

Minister of Education & Technical Education

Dear Parent/Guardian,

Welcome to Primary 5 Mathematics Techbook™! This comprehensive program inspires students to make sense of the world around them and to think and act like mathematicians. Throughout the digital and print program, students learn to reason mathematically, communicate using mathematical language, ask meaningful questions, solve complex problems, and work collaboratively with peers.



Primary 5 Mathematics Techbook was designed and written to teach to the Ministry of Education and Technical Education (MOETE) Primary 5 mathematics standards. The structure of Primary 5 Mathematics Techbook represents the Ministry's shifts in the Framework for Education 2.0, specifically focusing on accessing new and prior knowledge, building contextual understanding and procedural fluency, and making connections across mathematics to support application of skills and concepts. To help students make sense of mathematical content, the program also integrates a thematic approach and a variety of real-world scenarios.

Dear Parent/Guardian, *continued*

Primary 5 Mathematics Techbook challenges students to build on what they learned in previous grades, applying concepts and skills in new ways. Students also learn new and complex concepts and skills that prepare them for the challenges of Primary 6 and beyond. Primary 5 students assume greater responsibility for their own learning and are encouraged to seek opportunities to apply the mathematics they are learning in the world around them.

The major work of Primary 5 includes multiplication and division of whole numbers, fractions, mixed numbers, and decimals, as well as numerical expressions. Students also explore patterns, coordinate planes, and pie charts. Although these may seem like separate topics, students investigate and apply patterns and relationships among the topics to build a deeper understanding of each. They explore relationships between fractions and decimals, connect their understanding of two-dimensional figures to coordinate grids, apply the inverse relationship between multiplication and division, and draw parallels between fractions, decimals, and pie charts. Students learn to think like mathematicians as they notice patterns and rules, persevere to solve challenging problems, represent and explain their thinking, model their solutions, and strive for accuracy.

To inspire and motivate learning and curiosity, Primary 5 Mathematics Techbook features clear and engaging text, videos, digital tools, and Hands-On Activities. Hands-On Activities require students to investigate patterns and rules in mathematics and challenge them to communicate using mathematical language and models. The program also engages students in many kinds of writing and asks them to explain their reasoning and support their thinking using words, numbers, pictures, and symbols. When students engage in rich tasks that access prior knowledge and build reasoning, it is easier for them to make connections to the real world and to other mathematical learning.





Primary 5 Mathematics Techbook is divided into units. Each unit is divided into concepts, and each concept is divided into lessons. Each lesson has three main sections: ACCESS, BUILD, and CONNECT.

ACCESS Students activate their prior knowledge and begin to develop and express mathematical language.

BUILD Students focus on communicating their understanding, reasoning, evidence, and mathematical strategies.

CONNECT Students build deep conceptual understanding and a strong foundation for accessing knowledge in future lessons.

In addition, **WRAP-UP**, **PRACTICE**, and **CHECK YOUR UNDERSTANDING** features allow students to demonstrate their learning either verbally or in writing.

Within this Student Edition, you will find QR codes and Quick Codes that take you and your student to a corresponding section of Primary 5 Mathematics Techbook online.

We encourage you to support your student in using the print and online interactive materials on any device. Together, may you and your student enjoy a fantastic year of mathematics.

Sincerely,

The Math Team



UNIT

1

Theme 1 | Number Sense and Operations

Unit 1
Decimal Place Value and Computation

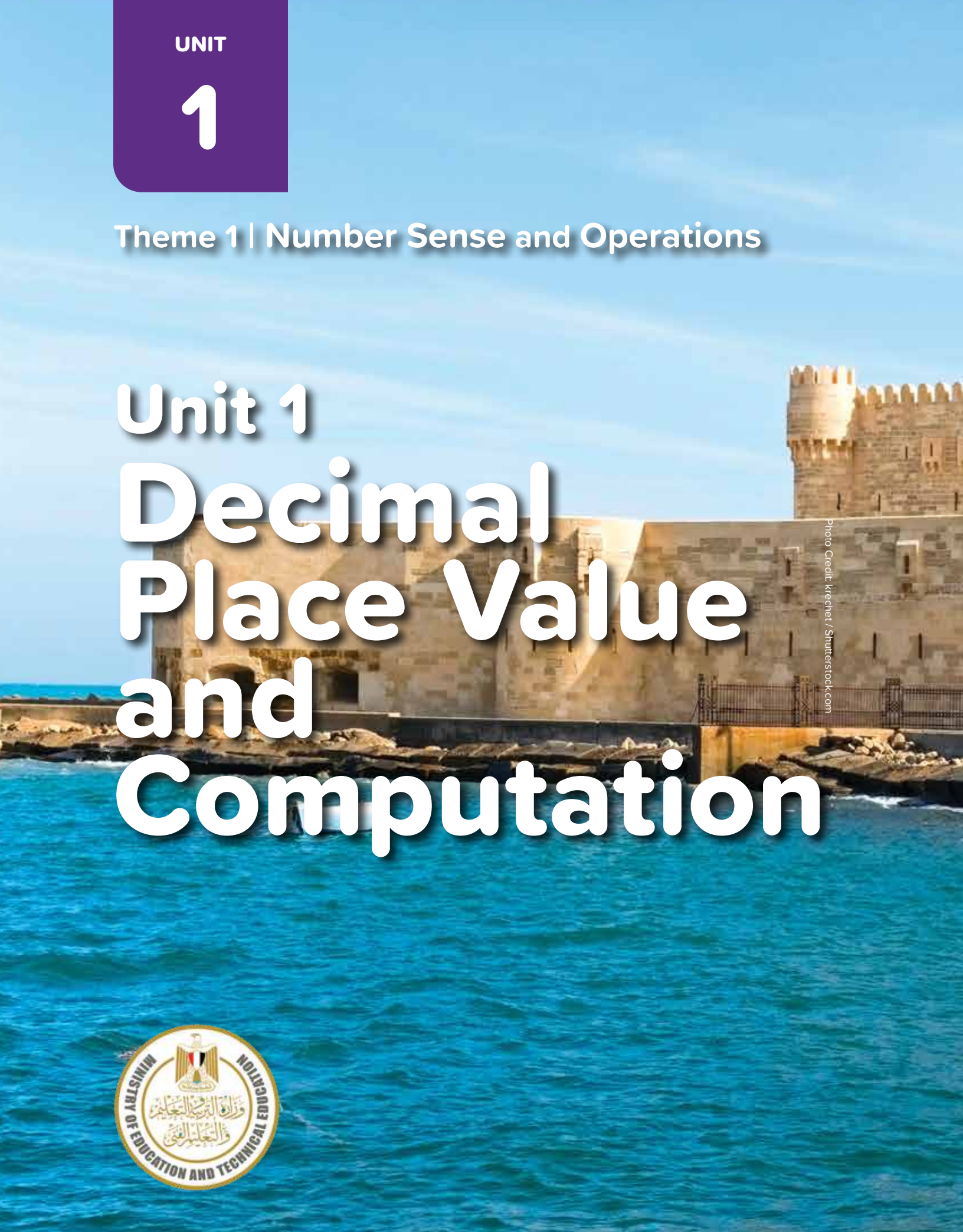


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MINISTRY OF EDUCATION AND TECHNICAL EDUCATION



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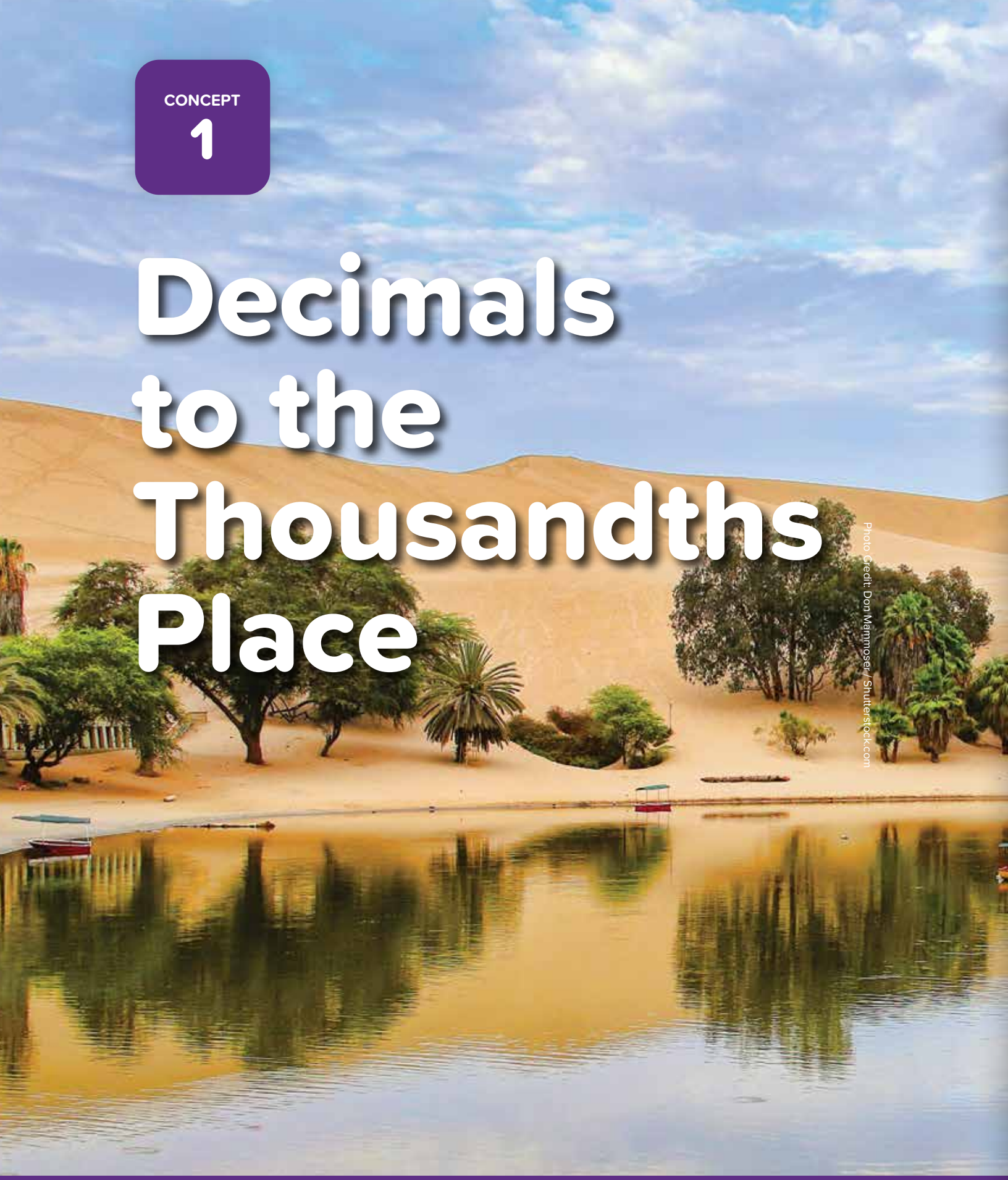
Place Value Planning

Unit Video Questions

Quick Code
egm5001

The Unit 1 Opener Video, Place Value Planning, explores math around Egypt through decimals. In this unit, you will investigate place value patterns and relationships. You will learn strategies to estimate sums and differences as well as add and subtract whole numbers and decimals.

- ☐ How did decimals help the students make sense of the world around them?
- ☐ What did the students find out about decimals and place value?



CONCEPT
1

Decimals to the Thousandths Place

Photo Credit: Don Mammoser / Shutterstock.com

LESSON 1

The Journey Begins

Quick Code
egm5003

Learning Targets

- I can read numbers from the **Milliards** place to the **Hundredths** place.
- I can identify the **value** of **digits** from the Milliards place to the Hundredths place.

ACCESS

How Big Is the Basin? Read the passage and follow the directions to complete the learning activity.



The Fayoum Basin

For our first journey, we visit Fayoum. It is located south of Cairo and west of the Nile. It is a large basin, or low-lying area, estimated to have an area of about 6,069 square kilometers.

Using the information in the paragraph, write three other numbers that could be given as the approximate area of the basin. Remember to label the units.

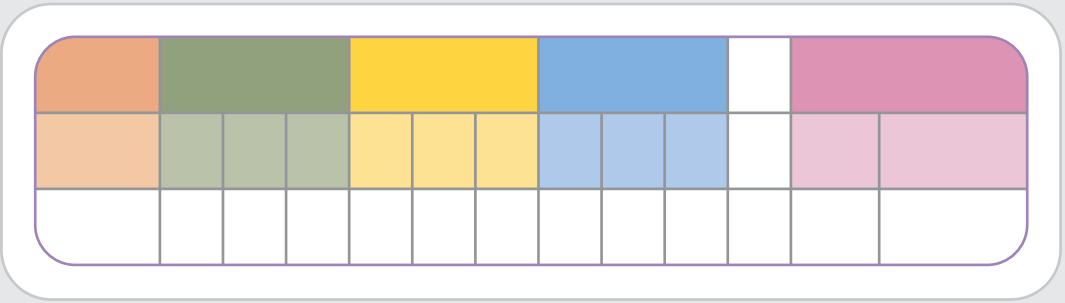
Photo Credit: (a) Don Mammoser / Shutterstock.com, (b) Justina Elgaafary / Shutterstock.com

BUILD

The Value of Place Follow the directions to complete each problem.

Whiteboard: 1. Use the terms in the word bank to fill in the place values in the chart. You can abbreviate Ones (O), Tens (T), and Hundreds (H) so they fit in the boxes.

Hundreds	Hundreds	Hundreds	Hundredths
Milliards	Millions	Ones	Ones
Ones	Ones	Ones	Tens
Tens	Tens	Tenths	Thousands



2. In 734.28 the digit 8 is in the _____ place. Its value is _____.

3. In 452.09 the digit 5 is in the _____ place. Its value is _____.

Whiteboard: 4. Write the following number in the place value chart: six hundred forty-two thousand, five hundred one, and fifty-one hundredths.

Milliards	Millions			Thousands			Ones			•	Decimals	
O	H	T	O	H	T	O	H	T	O	•	Tenths	Hundredths

Photo Credit: Don Mammoser / Shutterstock.com

Whiteboard: 5. Use the digits to create the greatest possible number. Record it in the place value chart.

7, 3, 6, 0, 2, 1, 4, 9, 2, 7

Milliards	Millions			Thousands			Ones			•	Decimals	
O	H	T	O	H	T	O	H	T	O	•	Tenths	Hundredths

Whiteboard: 6. Use the digits to create the smallest possible number. Record it in the place value chart.

7, 3, 6, 0, 2, 1, 4, 9, 2, 7

Milliards	Millions			Thousands			Ones			•	Decimals	
O	H	T	O	H	T	O	H	T	O	•	Tenths	Hundredths

Photo Credit: Don Mammoser / Shutterstock.com

CONNECT

Math around Egypt: the Fayoum Basin Review the passage about the Fayoum Basin and then answer the question.

How else could you use whole numbers or decimal numbers to describe the Fayoum Basin? You may use example numbers in your answer even if the numbers are not accurate in real life.

LESSON 2

Decimals to the Thousandths Place

Quick Code
egm5005

Learning Targets

- I can read decimal numbers to the **Thousandths** place.
- I can write decimal numbers to the Thousandths place.

ACCESS

Birds of the Fayoum Basin Read the passage, and then solve the problem.

Fayoum is a very popular bird-watching destination in Egypt. Birds migrate to the basin for the plants and waters of Qarun Lake. Qarun Lake is the largest saltwater lake in Egypt and one of the oldest natural lakes in the world. Some of the birds that can be seen at Qarun Lake are little grebes, grey herons, purple herons, little egrets, and great egrets.



Purple Heron

Photo Credit: (a) Don Mammoser / Shutterstock.com, (b) Hany Gewily / Shutterstock.com

The Purple Heron is the smaller of the two herons. It is tall at 70–90 centimeters, but it weighs only 0.50–1.35 kilograms. Below are the weights of three purple herons. For each number, record the following:

A. the digit that is in the Tenths place

B. the digit that is in the Ones place

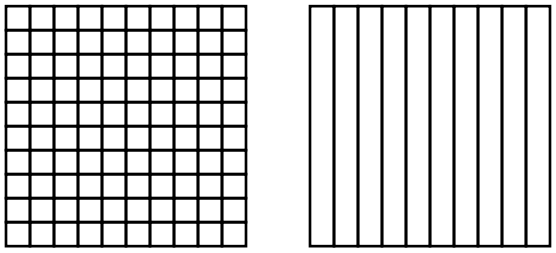
C. the digit that is in the Hundredths place

Bird One: 0.65 kilogram
Bird Two: 1.27 kilograms
Bird Three: 0.875 kilogram

BUILD

Plotting Out a City for a Thousand Read the problem and share your thinking with a Shoulder Partner.

Akram, a city planner, has two large square plots of land that were the same size. The first plot is divided into 10 equal plots of land for residents. The second one is divided into 100 equal plots of land. Then, Akram learns he must plan another square plot that has 1,000 equal pieces. How can he use the plot that is divided into 10 or the plot divided into 100 to make sure he has 1,000 equal parts? On which plot of land would you rather live? Why?



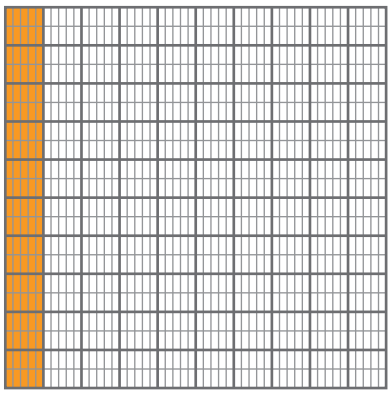
Spin a Decimal Practice modeling, reading, and writing decimals to the Thousandths.

Directions:

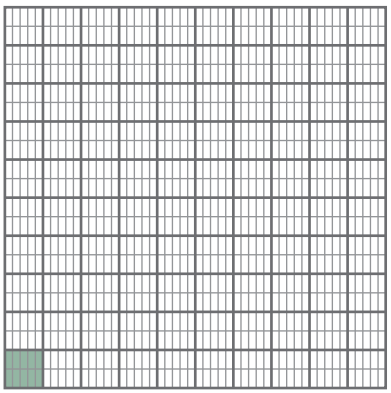
1. Select three colors: one for Tenths, one for Hundredths, and one for Thousandths.
2. Your teacher will spin a number for each decimal place. Shade in a grid to model the numbers your teacher spins. Be sure each decimal value is a different color.
3. Record the final decimal that the model represents. Compare your work with a partner and practice saying the decimal.

Photo Credit: Don Mammoser / Shutterstock.com

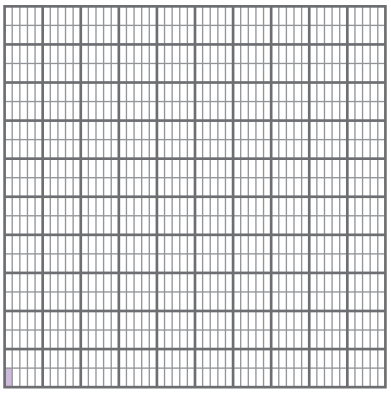
4. Repeat with a new grid.



1 Tenth

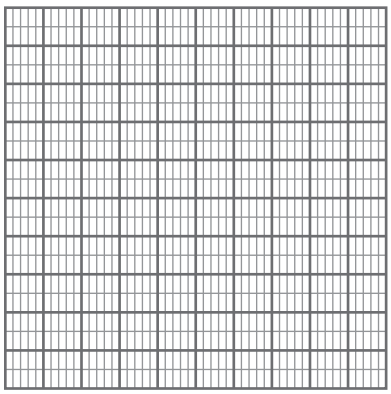


1 Hundredth

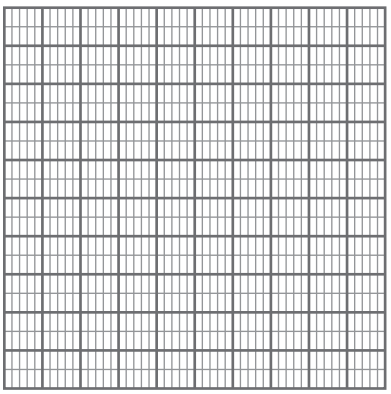


1 Thousandth

1.



2.

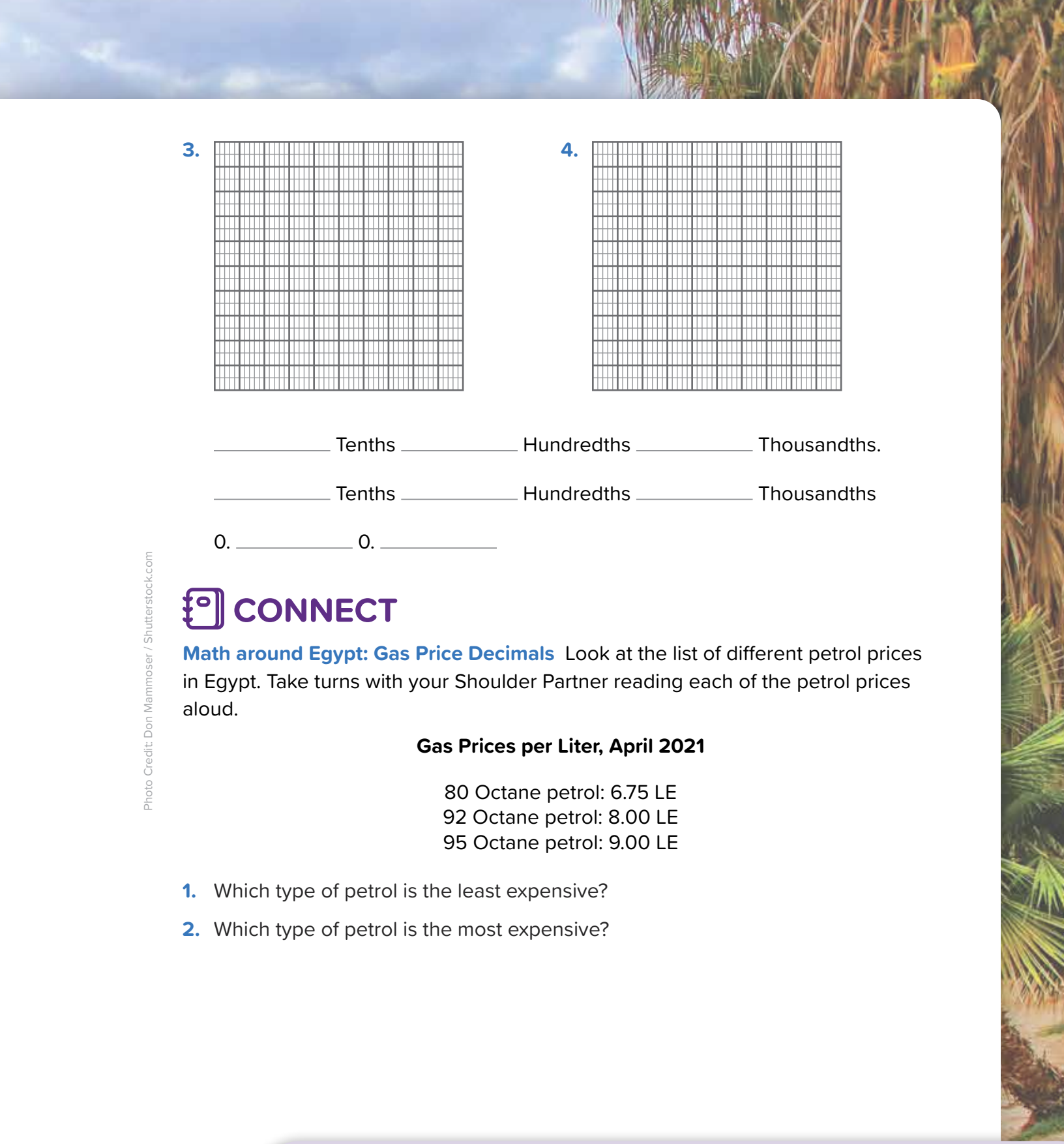


_____ Tenths _____ Hundredths _____ Thousandths.

_____ Tenths _____ Hundredths _____ Thousandths

0. _____ 0. _____

Photo Credit: Don Mammoser / Shutterstock.com



3.

4.

_____ Tenths _____ Hundredths _____ Thousandths.

_____ Tenths _____ Hundredths _____ Thousandths

0. _____ 0. _____

Photo Credit: Don Mammoser / Shutterstock.com

CONNECT

Math around Egypt: Gas Price Decimals Look at the list of different petrol prices in Egypt. Take turns with your Shoulder Partner reading each of the petrol prices aloud.

Gas Prices per Liter, April 2021

80 Octane petrol: 6.75 LE
92 Octane petrol: 8.00 LE
95 Octane petrol: 9.00 LE

1. Which type of petrol is the least expensive?
2. Which type of petrol is the most expensive?

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 3

Place Value Shuffle

Quick Code
egm5007

Learning Target

- I can explain how a digit changes value as it moves to the left or right in a decimal or whole number.

ACCESS

Which Number Fits Which? Read the categories describing data about Fayoum. Decide which value best represents each category.

Categories	Values
1. Population	A. 112
2. Approximate square kilometers of Wadi El Rayan, a protected National Park	B. 30
3. Kilometers from Cairo	C. 3,615
4. Average Temperature in Celsius in the summer	D. 1,800

Photo Credit: Don Mammoser / Shutterstock.com

BUILD

Place Value Shuffle Talk with a partner about the questions. Be prepared to discuss your ideas with the class.

1. What would 3,615 become if it were increased by a factor of 10?

2. What expression could we write to represent this?

3. What is the relationship between the whole number 3,615 increasing by a factor of 10 ($3,615 \times 10$) and each digit within that number?

Ten Is a Powerful Number Use the place value charts to solve each problem. Fill in the blanks to show how the value of each digit also changed. An example is shown.

Example: $57 \times 10 =$

Thousands	Ones			•	Decimals	
O	H	T	O	•	Tenths	Hundredths
		5	7	•	0	0
	5	7	0	•	0	0

The value of the whole number increased by a factor of 10.

The value of the 5 increased by a factor of 10 from 50 to 500.

The value of the 7 increased by a factor of 10 from 7 to 70.

1. $57 \div 10 =$

Thousands	Ones			•	Decimals	
O	H	T	O	•	Tenths	Hundredths

2. The value of the whole number _____ (increased/decreased) by a factor of 10.

The value of the _____ (first digit) _____ (increased/decreased) by a factor of 10 from _____ to _____.

The value of the _____ (second digit) _____ (increased/decreased) by a factor of 10 from _____ to _____.

Photo Credit: Don Mammoser / Shutterstock.com

3. $6.5 \times 10 =$

Thousands	Ones			•	Decimals	
O	H	T	O	•	Tenths	Hundredths

4. The value of the whole number _____ (increased/decreased) by a factor of 10.

The value of the _____ (first digit) _____ (increased/decreased) by a factor of 10 from _____ to _____.

The value of the _____ (second digit) _____ (increased/decreased) by a factor of 10 from _____ to _____.

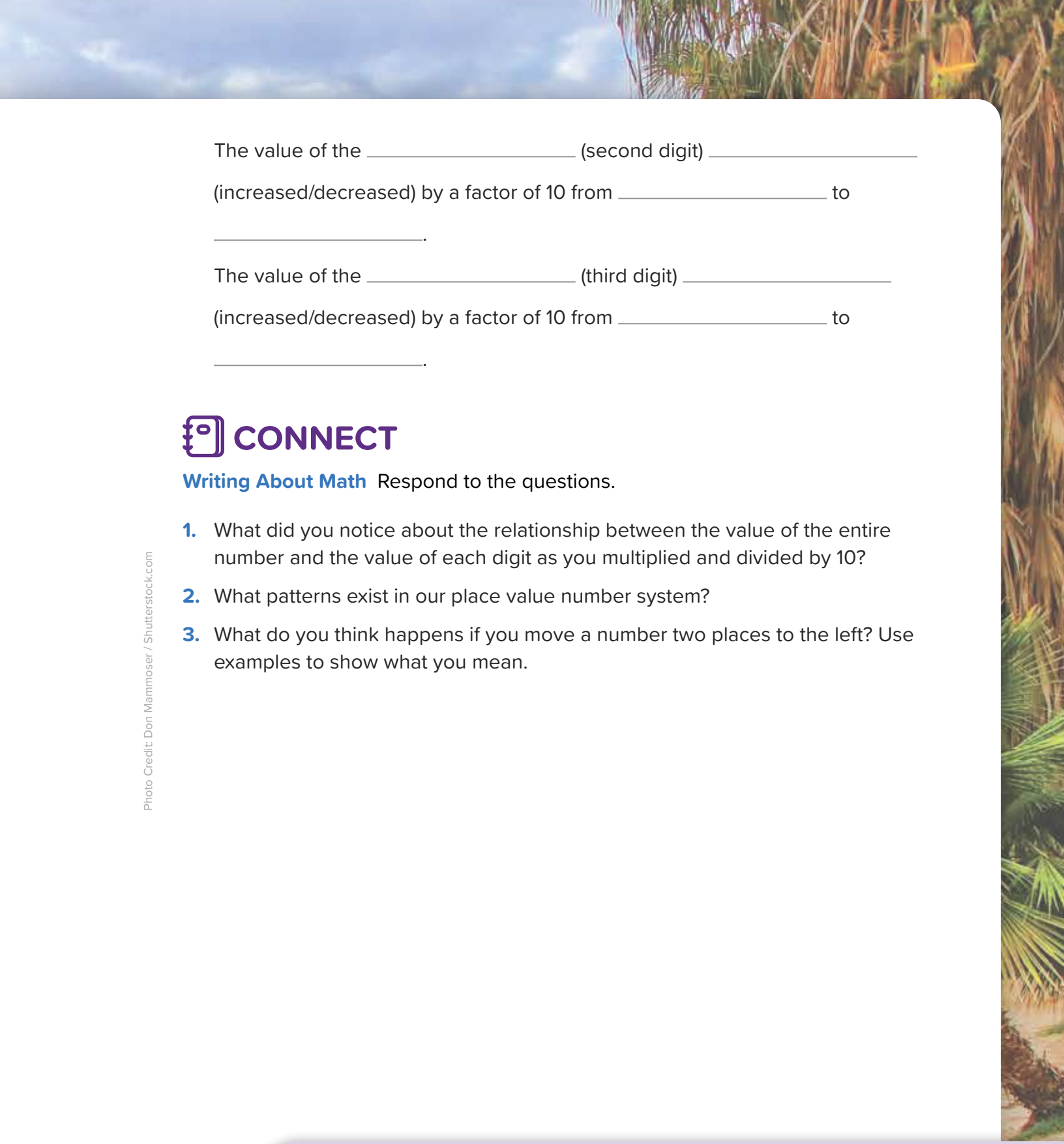
5. $345 \div 10 =$

Thousands	Ones			•	Decimals	
O	H	T	O	•	Tenths	Hundredths

6. The value of the whole number _____ (increased/decreased) by a factor of 10.

The value of the _____ (first digit) _____ (increased/decreased) by a factor of 10 from _____ to _____.

Photo Credit: Don Mammoser / Shutterstock.com



The value of the _____ (second digit) _____ (increased/decreased) by a factor of 10 from _____ to _____.

The value of the _____ (third digit) _____ (increased/decreased) by a factor of 10 from _____ to _____.

CONNECT

Writing About Math Respond to the questions.

1. What did you notice about the relationship between the value of the entire number and the value of each digit as you multiplied and divided by 10?
2. What patterns exist in our place value number system?
3. What do you think happens if you move a number two places to the left? Use examples to show what you mean.

Photo Credit: Don Mammoser / Shutterstock.com

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 4

Composing and Decomposing Decimals

Quick Code
egm5009

Learning Target

- I can **compose** and **decompose** decimals in multiple ways.

ACCESS

Daylight in Fayoum Use the bar graph to help you answer the questions.

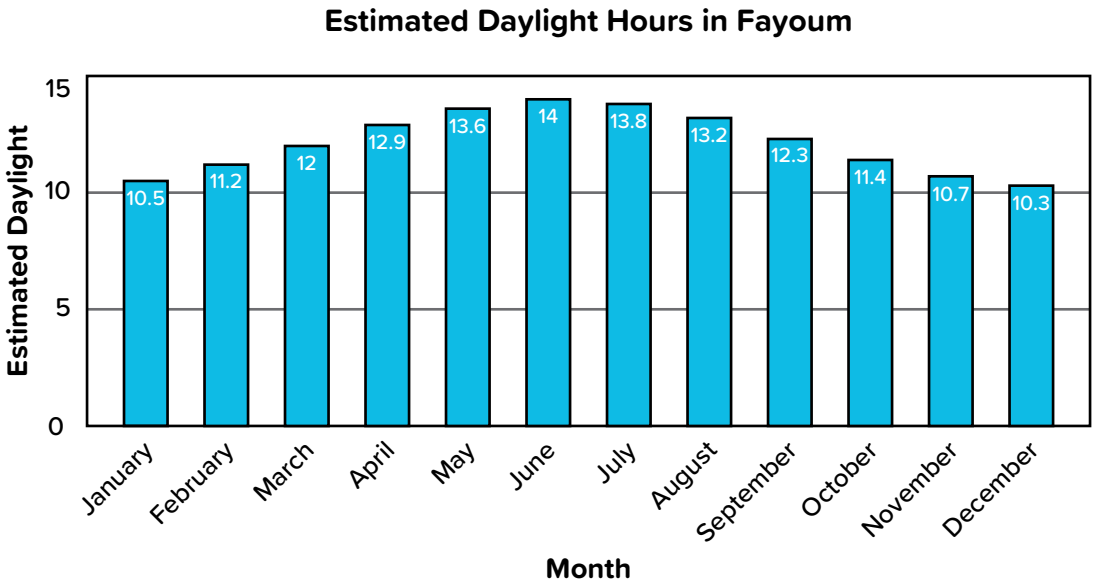


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1. You want to visit Fayoum for 5 months to gather data to create a map. Which five months have the most daylight?
2. Which month has a 5 in the Tenths place?
3. Which month has the most daylight?
4. Which months have 3s in the Ones place?
5. Which month has the least daylight?

BUILD

Decomposing Decimal Numbers Work with your teacher to find multiple ways to compose and decompose 12.42.

Thousands	Ones			•	Decimals	
O	H	T	O	•	Tenths	Hundredths
		1	2	•	4	2

$$10 + 2 + 0.4 + 0.02$$

How else could 12.42 be decomposed? Record your ideas.

Partner Practice For each problem, record the number in the place value chart. Work with your partner to decompose the number in expanded form and then in two other ways.

1. 34.527

Thousands	Ones			•	Decimals		
O	H	T	O	•	Tenths	Hundredths	Thousandths

2. 1st way (expanded form): _____

2nd way: _____

3rd way: _____

Photo Credit: Don Mammoser / Shutterstock.com

3. 21.045

Thousands	Ones			•	Decimals		
O	H	T	O	•	Tenths	Hundredths	Thousandths

4. 1st way (expanded form): _____

2nd way: _____

3rd way: _____

5. 14.932

Thousands	Ones			•	Decimals		
O	H	T	O	•	Tenths	Hundredths	Thousandths

6. 1st way (expanded form): _____

2nd way: _____

3rd way: _____

7. 231.128

Thousands	Ones			•	Decimals		
O	H	T	O	•	Tenths	Hundredths	Thousandths

Photo Credit: Don Mammoser / Shutterstock.com

8. 1st way (expanded form): _____

2nd way: _____

3rd way: _____

9. 508.17

Thousands	Ones			•	Decimals		
O	H	T	O	•	Tenths	Hundredths	Thousandths

10. 1st way (expanded form): _____

2nd way: _____

3rd way: _____

CONNECT

Record the Weather Read and respond to the questions.

Samir and Tahani recorded January's daily temperature in Fayoum. Their data said the approximate temperature for the month of January was 16.3°C.

Tahani said this temperature was "Sixteen and three tenths degrees Celsius." Samir read this temperature as "Sixteen and thirty hundredths degrees Celsius."

Who is correct? How do you know? What other ways could you write 16.3°C in standard form using what you know about decimal place value?

Photo Credit: Don Mammoser / Shutterstock.com

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 5

Comparing Decimals

Quick Code
egm5011

Learning Target

- I can compare decimals to the Thousandths place.

ACCESS

Comparing Temperatures at the Basin At the Fayoum Basin temperatures vary greatly. The numbers are the temperatures recorded on one day in May. All numbers are in degrees Celsius. Compare each set of numbers using the symbols for greater than (>), less than (<), or equal to (=).

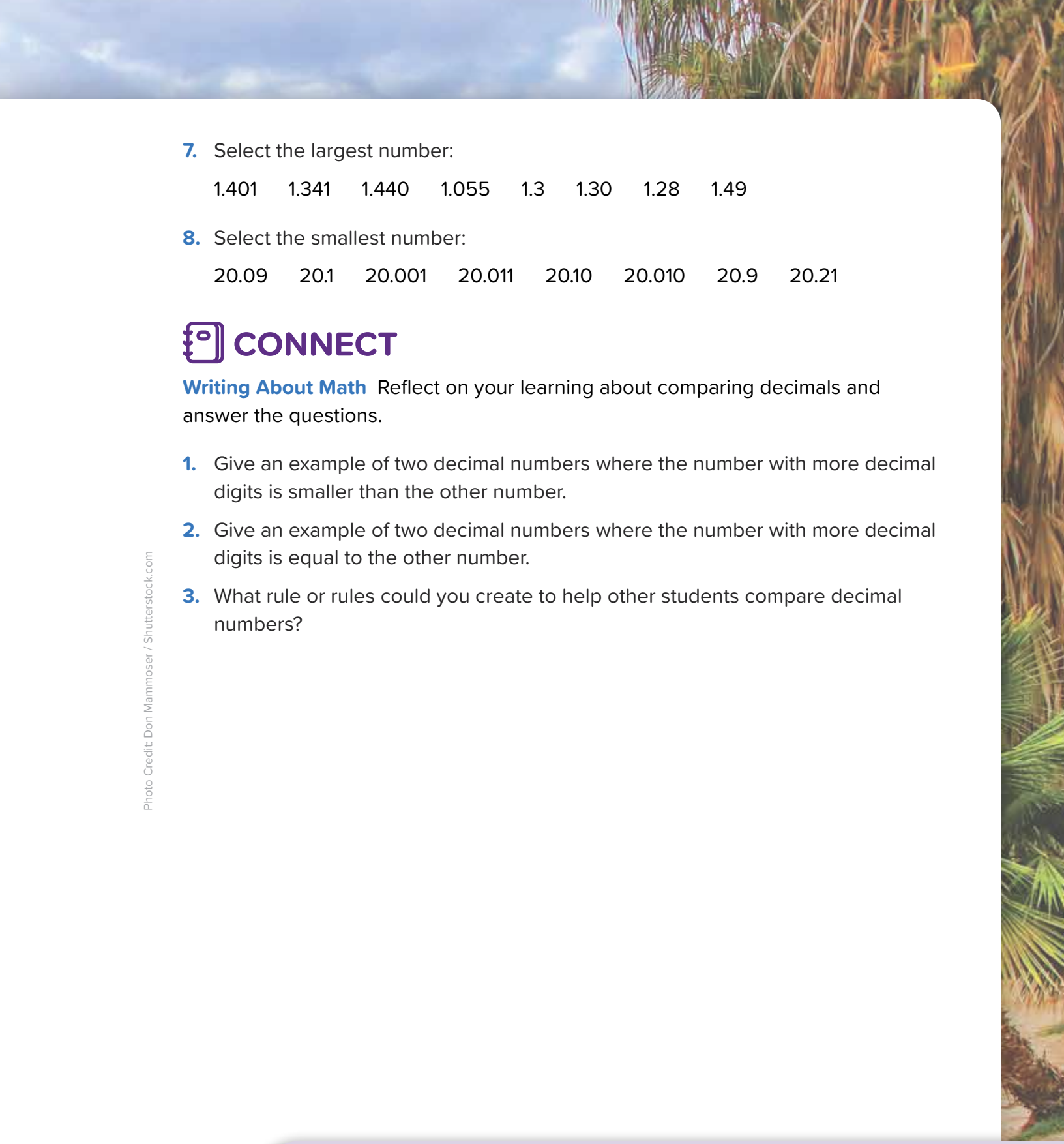
1. 29.9° ____ 30.2°
2. 36.5° ____ 35.6°
3. 40.5° ____ 41.0°
4. 35.2° ____ 34.7°
5. 38.80° ____ 38.8°
6. What strategy did you use to compare the temperatures?

BUILD

Comparing Decimals Compare the decimal numbers using the symbols for greater than (>), less than (<), or equal to (=). Draw a place value table to help you, if needed.

1. 45.057 ____ 45.100
2. 98.013 ____ 98.101
3. 50.009 ____ 50.100
4. 10.1 ____ 10.011
5. 2.01 ____ 2.099
6. 34.5 ____ 34.500

Photo Credit: Don Mammoser / Shutterstock.com



7. Select the largest number:

 1.401 1.341 1.440 1.055 1.3 1.30 1.28 1.49

8. Select the smallest number:

 20.09 20.1 20.001 20.011 20.10 20.010 20.9 20.21

CONNECT

Writing About Math Reflect on your learning about comparing decimals and answer the questions.

1. Give an example of two decimal numbers where the number with more decimal digits is smaller than the other number.
2. Give an example of two decimal numbers where the number with more decimal digits is equal to the other number.
3. What rule or rules could you create to help other students compare decimal numbers?

Photo Credit: Don Mammoser / Shutterstock.com

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 6

Rounding Decimals

Quick Code
egm5013

Learning Target

- I can **round** numbers to the nearest Tenth, Hundredth, or Thousandth.

ACCESS

Waterfall Region: Error Analysis Read about the Wadi El Rayan lakes and waterfalls. Then, complete the error analysis problem.

Southwest of Fayoum City is a region called the Valley of Wadi El Rayan. This region has two man-made lakes.

Water first reached the upper lake, which had an area of 50.90 square kilometers. Then, a stream flowed from the lake down through a deeper part of the basin and formed another lake with an area of 62.00 square kilometers.

A student wants to round the area of the upper lake to the nearest whole number. He rounds 50.90 square kilometers to 50.00 square kilometers.



Wadi El Rayan Waterfall

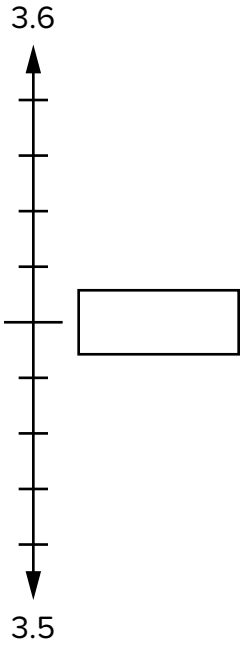
Photo Credit: (a) Don Mammoser / Shutterstock.com, (b) keem ahmed / Shutterstock.com

1. What did the student do correctly?
2. What did the student do incorrectly? Why do you think he made this error?
3. Try to solve the problem correctly. Explain your thinking.

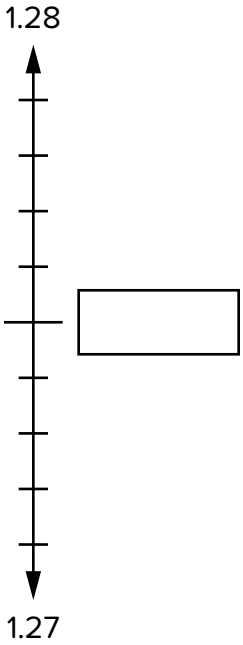
BUILD

Round and Round Label the midpoint of the number lines. Place the given decimal number at its proper location.

1. Round 3.54 to the nearest Tenth.

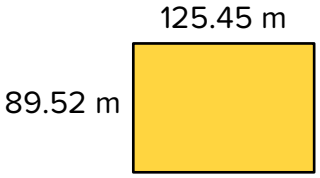


2. Round 1.277 to the nearest Hundredth.



Strategic Rounding Solve these problems using either the midpoint or Rounding Rule strategy.

1. A farmer is building a new fence for her sheep field. She wants to build a fence around the whole field. Estimate how much fencing you think she will need by rounding each dimension to the nearest Tenth. Explain your thinking.



2. Mazen is planning a trip from Cairo to the waterfall region in Wadi El Rayan. He will travel 147.72 kilometers. Round the distance to the nearest Tenth.

3. Mazen stops to have a snack and stretch after driving 73.255 kilometers. Round the distance to the nearest Hundredth.

Photo Credit: Don Mammoser / Shutterstock.com

4. Fill in the chart as you round the decimal to the stated place value.

Number	Round to the nearest whole number	Round to the nearest Tenth	Round to the nearest Hundredth
56.284			

CONNECT

Math around Egypt: Waterfalls Read the passage, and then answer the question.

There are several cascades along the stream between the two lakes in Wadi El Rayan. The distance between the falls is approximately 30–35 meters, and the width of the island dividing the cascades is between 20 and 50 meters.

A geologist measured the exact distance between two of the falls at 31.45 meters and between two others at 36.921 meters. If both distances were rounded to the nearest whole number, would they fall into the range given in the passage? Explain your thinking.

Photo Credit: Don Mammoser / Shutterstock.com

Check Your Understanding

Follow your teacher's instructions to complete this activity.


Photo Credit: Don Mammoser / Shutterstock.com

CONCEPT
2

Adding and Subtracting Decimals

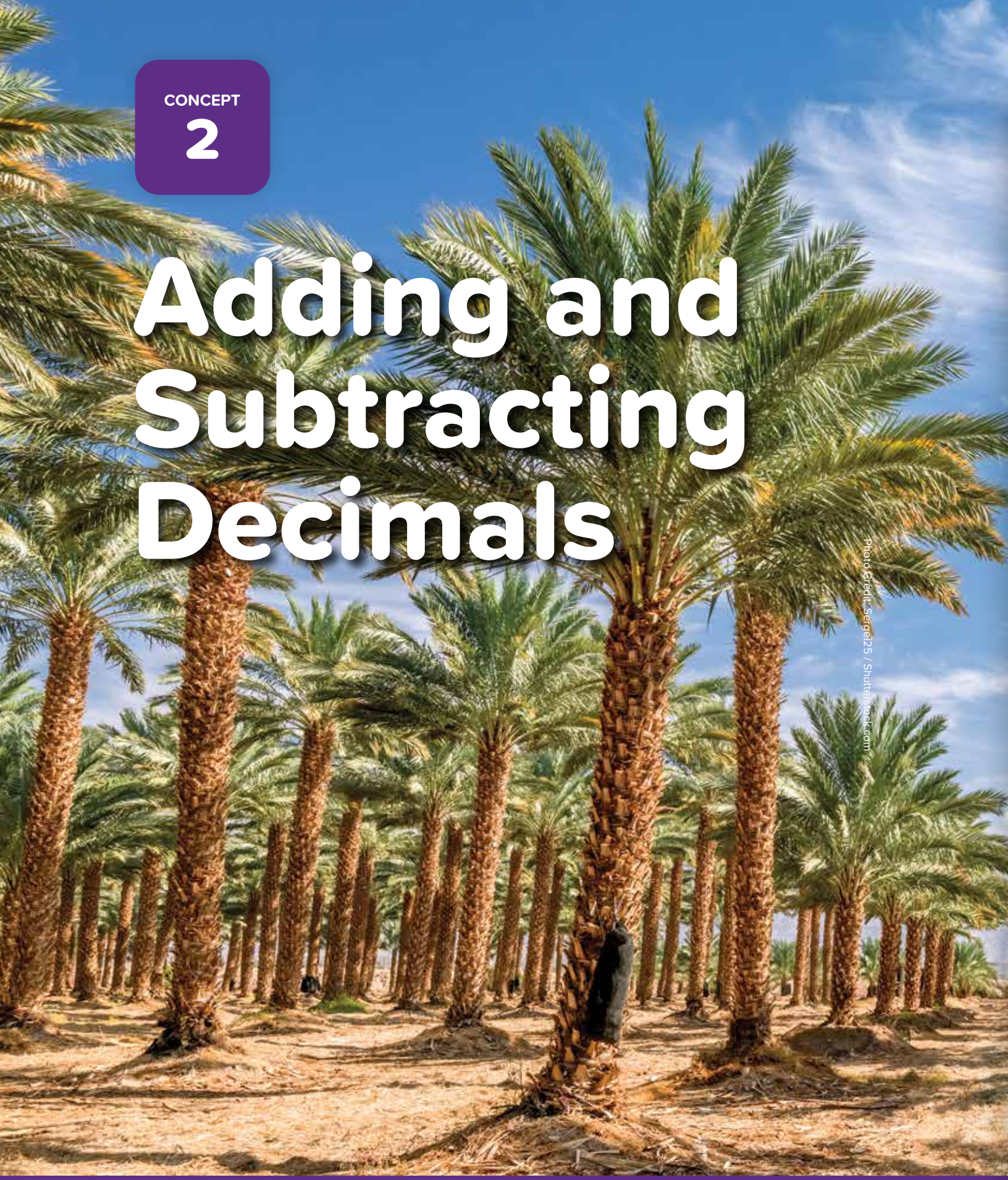


Photo Credit: Sergei25 / Shutterstock.com

LESSON 7

Estimating Decimal Sums

Quick Code
egm5016

Learning Target

- I can **estimate** **sums** of decimal numbers.

ACCESS

Getting Close to a Whole Respond to the prompts with as many ideas as you can. Be prepared to share your ideas.

1. List some numbers that are close to one, but less than a whole.
2. List some numbers that are not close to one and are less than a whole.

BUILD

Easy Numbers Work with your teacher to practice using **benchmark** numbers to estimate.

Estimate Amounts Estimate the sum. Be prepared to share how you estimated and why you chose that way.

$2.361 + 3.783$

Estimate: _____

Partner Practice You and your partner will work on estimating one problem at a time. Do not tell your partner your estimation strategy. When you are each done, compare and discuss your strategies and estimates.

Estimation Strategies (Try to use as many as you can.)		
Front-End Estimation Round to Ones	Benchmark Decimals Round to Tenths	Separate Wholes and Parts Round to Hundredths

Photo Credit: Sergei25 / Shutterstock.com

1. 3.451 + 8.091

 Estimate: _____

2. 9.98 + 4.56

 Estimate: _____

3. 4.981 + 5.019

 Estimate: _____

4. Samar wanted to ride her bike 40 kilometers this week. By Thursday she had ridden 34.99 kilometers. On Friday she rode 4.01 kilometers. Estimate to see if she has met her goal.

 Estimate: _____

5. Taha has 54.20 LE. His brother has 45.75 LE. They want to combine their money to purchase a box of apples for 100 LE. Estimate to see if they have enough money.

 Estimate: _____

More Partner Practice According to ancient texts, the fertility of the Nile River banks has allowed farmers to grow date palms since as long ago as 2500 BC. Date palms continue to be a part of the geography and economy of modern-day Egypt. Working with a partner, use the data to answer the questions.



Bank of the Nile River

Photo Credit: (a) Sergei25 / Shutterstock.com, (b) Linda Harms / Shutterstock.com

Governorate	Number of Date Palm Trees	Typical Mass of Date Palm Trees (kg)
Alexandria	25,062	97.16
Giza	456,939	134.76
Qena	285,825	60.99
New Valley	692,491	51.66

1. Estimate the typical mass of date palms in the governorates of Alexandria and New Valley.

2. Would the combined typical mass of date palms in New Valley and Qena be greater than or less than the typical mass of the date palms in Giza?

Photo Credit: Sergei25 / Shutterstock.com

CONNECT

Math around Egypt: The Shadoof Read the passage and respond to the question.

The shadoof is an ancient tool that has been used by farmers along the Nile. With this tool, farmers can get water for the crops in their fields. A shadoof is made of a pole with a bucket attached to one end. The farmer submerses the bucket and a counterbalance then pulls it up. Although this device was created in ancient times, it is still used today in Egypt and in other areas.

If a farmer can lift 94.635 liters of water a minute in his shadoof, about how many liters can he lift in 4 minutes?



Shadoof

Photo Credit: (a) Sergei25 / Shutterstock.com, (b) RussieseO / Shutterstock.com

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 8

Modeling Decimal Addition

Quick Code
egm5018

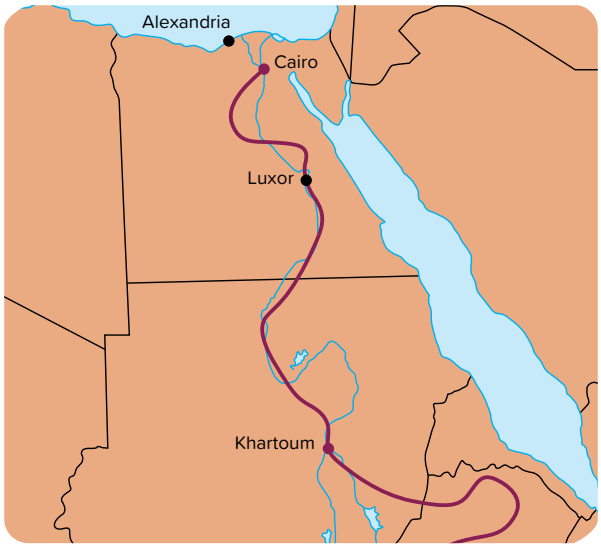
Learning Target

- I can model decimal addition.

ACCESS

The Nile River Read the passage and respond to the question.

The Nile is the largest river system in the world. The Nile flows north more than 6,650 kilometers into the Mediterranean Sea, and 95 percent of Egyptians live within a few kilometers of the river. The Nile has two main tributaries: The White Nile and the Blue Nile that flow into the river. The confluence of these rivers is in Khartoum, Sudan, where they join to form the Nile. The river then flows north where it meets the Mediterranean Sea.



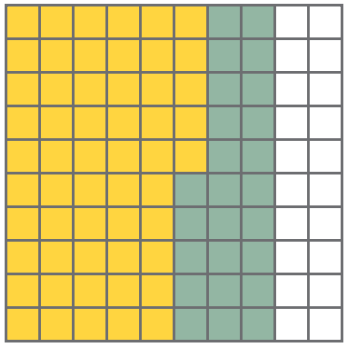
You are traveling from where the Nile River meets the Mediterranean Sea to the confluence of the Blue and White Nile in Khartoum. This is a distance of 2,406.69 kilometers.

1. Round 2,406.69 to the nearest Thousand.
2. Round 2,406.69 to the nearest Hundred.
3. Round 2,406.69 to the nearest One.
4. Round 2,406.69 to the nearest Tenth.

Photo Credit: Sergei25 / Shutterstock.com

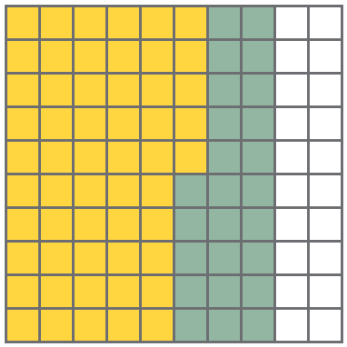
BUILD

A Model Decimal There are two decimal numbers in the decimal model. One number is represented in yellow and the other is represented in green. Record the decimal numbers in the place value chart.



Thousands	Ones			•	Decimals	
O	H	T	O	•	Tenths	Hundredths

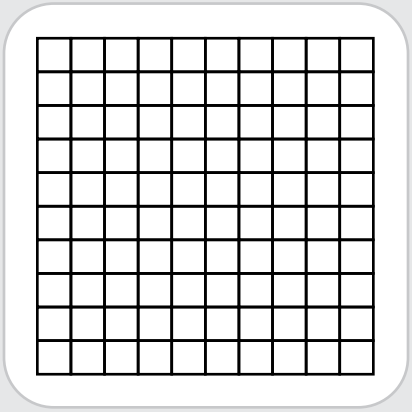
Express the Model Write an expression to match the model.



_____ + _____

Photo Credit: Sergei25 / Shutterstock.com

Whiteboard: Make a Model Pick a two-digit decimal number. Create a model of it. Record your partner's decimal number on your model (be sure to use a different color).



Record Decimals Record the two decimal numbers in the place value chart.

Thousands	Ones			•	Decimals	
O	H	T	O	•	Tenths	Hundredths

Decimal Addition Write an addition sentence using the decimal numbers chosen by you and your partner.

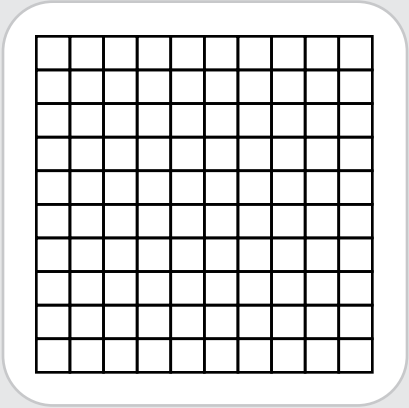
_____ + _____ = _____

Model Makers Follow the directions to complete the problem.

Estimate: 0.13 + 0.23 _____

Photo Credit: Sergei25 / Shutterstock.com

Whiteboard: Modeling Use two different colors to create a model of the expression 0.13 + 0.23.



More Model Makers Follow the directions to complete the problems.

1. Record 0.13 and 0.23 in the place value chart.

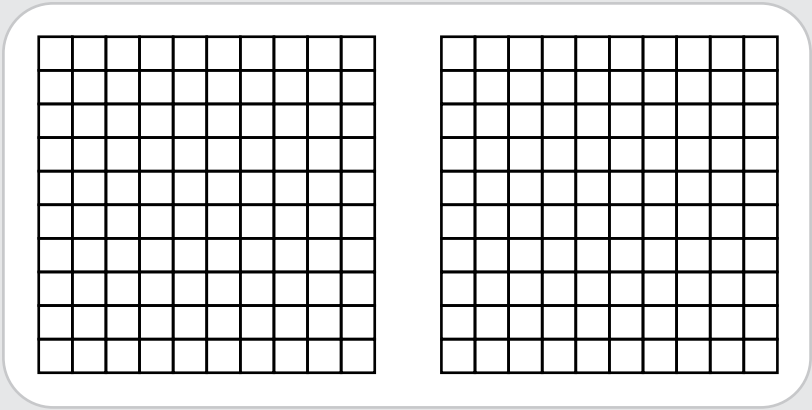
Thousands	Ones			•	Decimals	
O	H	T	O	•	Tenths	Hundredths

2. Evaluate: 0.13 + 0.23 = _____

3. Estimate: 0.97 + 0.42 _____

Photo Credit: Sergei25 / Shutterstock.com

Whiteboard: Model Addition Use two different colors to create a model of the expression 0.97 + 0.42.



Evaluate More Follow the directions to complete the problems.

1. Record 0.97 and 0.42 in the place value chart.

Thousands	Ones			•	Decimals	
O	H	T	O	•	Tenths	Hundredths

2. Evaluate: 0.97 + 0.42 = _____

3. Estimate: 0.05 + 0.05 _____

Whiteboard: Model the Expression Use two different colors to create a model of the expression 0.05 + 0.05.

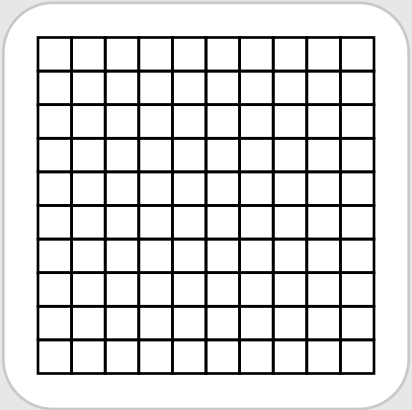


Photo Credit: Sergei25 / Shutterstock.com

Solve Follow the directions to complete the problems.

1. Record 0.05 and 0.05 in the place value chart.

Thousands	Ones			•	Decimals	
O	H	T	O	•	Tenths	Hundredths

2. Evaluate: 0.05 + 0.05 = _____

3. Estimate: 0.45 + 0.84 _____

Whiteboard: Model Another Expression Use two different colors to create a model of the expression 0.45 + 0.84.

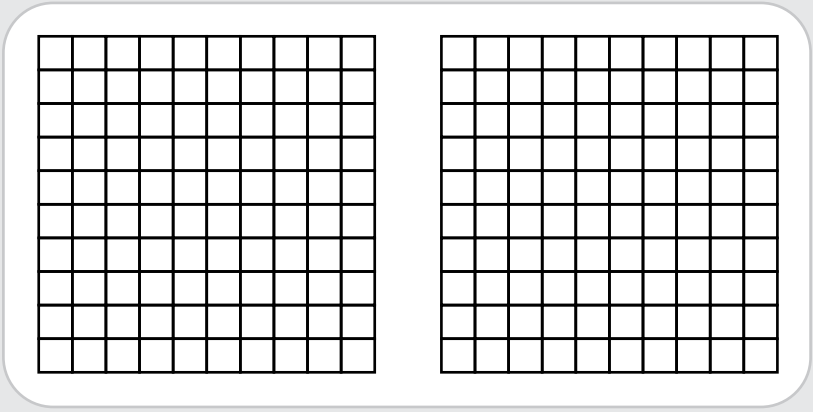


Photo Credit: Sergei25 / Shutterstock.com

Evaluate and Estimate Follow the directions to complete the problems.

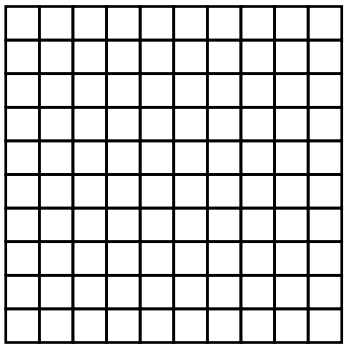
1. Record 0.45 and 0.84 in the place value chart.

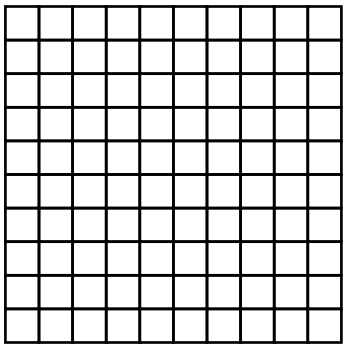
Thousands	Ones			•	Decimals	
O	H	T	O	•	Tenths	Hundredths

2. Evaluate: 0.45 + 0.84 = _____

3. Estimate the sum: 0.92 + 0.89 _____

Whiteboard: Model the Expression Again Use two different colors to create a model of the expression 0.92 + 0.89.





Evaluate Again Follow the directions to complete the problems.

1. Record 0.92 and 0.89 in the place value chart.

Thousands	Ones			•	Decimals	
O	H	T	O	•	Tenths	Hundredths

2. Evaluate: 0.92 + 0.89 = _____

Photo Credit: Sergei25 / Shutterstock.com

CONNECT

Math around Egypt: The Source of the White Nile Read the passage, and then respond to the questions.

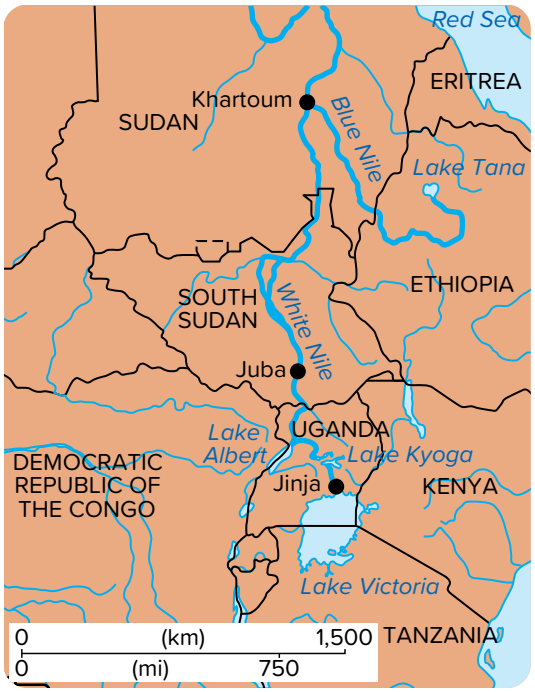


Photo Credit: Sergei25 / Shutterstock.com

You will now travel from Khartoum to Juba in South Sudan to see the source of the White Nile. This trip is 1,941.2 kilometers. Juba is also on the bank of the White Nile. From Juba, you will travel on to Jinja, Uganda. It is a distance of 687.9 kilometers. Jinga is locatad near the source of the White Nile. How long is your journey from Khartoum to Jinja?

1. Copy the place value chart and record the addends.

Thousands	Ones			•	Decimals		
O	H	T	O	•	Tenths	Hundredths	Thousandths

2. Write and solve an addition equation using the two decimal numbers.

_____ + _____ = _____

LESSON 9

Thinking Like a Mathematician

Quick Code
egm5020

Learning Targets

- I can apply strategies to add decimals to the Thousandths place.
- I can check the reasonableness of my answers.

ACCESS

Blue Nile versus White Nile Read the passage and then answer the question.

Compared to the White Nile, the Blue Nile is narrow and gets its name from the black sediment that it picks up as it travels. It is 1,450.02 kilometers long. The White Nile carries light gray sediment and is therefore lighter in color. The White Nile, including its tributaries, is 720 kilometers long.



Ali and Zeina want to find the length of both tributaries together. Ali wants to mentally find the sum of the two rivers. He rounds each number to the nearest Thousands place and says the length is about 5,000 kilometers. Zeina rounds each number to the Hundreds place and says the length is about 5,200 kilometers.

Find the actual answer to the total length of both rivers. Talk to a partner about who was closer to the actual sum and why.

Photo Credit: Sergei25 / Shutterstock.com



BUILD

Regroup or Not Evaluate each sum. Identify each digit's place value. Finally, compare answers with a partner.

1. 4 Thousandths + 3 Thousandths = _____ Thousandths

Place value: _____ Hundredth(s) _____ Thousandth(s)

2. 7 Thousandths + 4 Thousandths = _____ Thousandth(s)

Place value: _____ Hundredth(s) _____ Thousandth(s)

3. 39 Thousandths + 5 Thousandths = _____ Thousandth(s)

Place value: _____ Hundredth(s) _____ Thousandth(s)

4. 3 Hundredths + 85 Thousandths = _____ Thousandth(s)

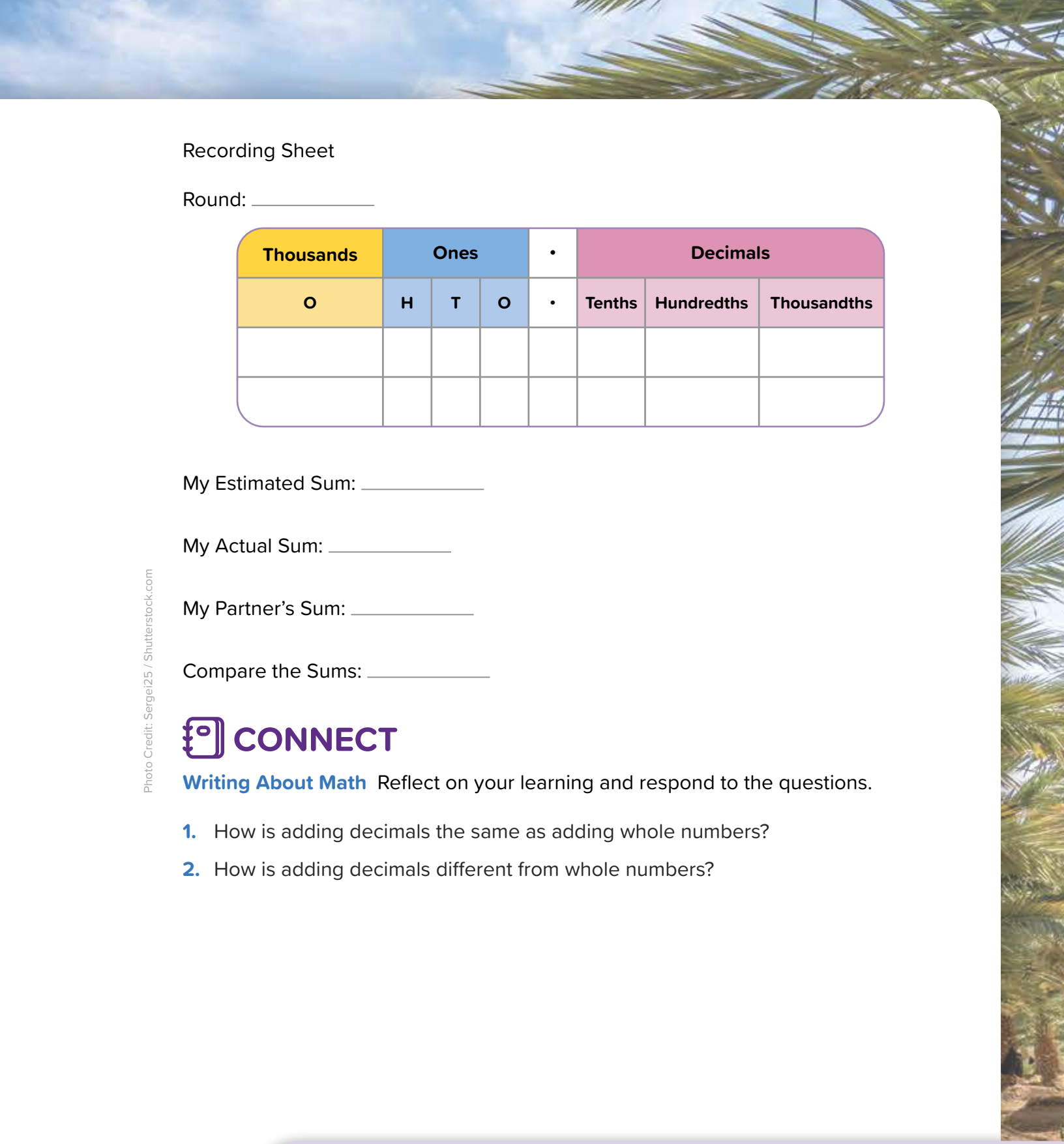
Place value: _____ Tenth(s) _____ Hundredth(s) _____ Thousandth(s)

Spin a Sum Play with a partner to practice estimating and adding decimals to the Thousandths. For each round, copy the place value table and recording sheet into your Math Notebook, and record your results.

Directions:

1. Each player spins all three spinners to create two decimal numbers and records their numbers in the place value chart.
2. Players use any strategy to estimate their sums and record their estimates.
3. Players find the actual sum of their problems.
4. Players record all of the sums and compare them using >, <, or =.
5. The player with the highest sum wins.
6. Players discuss how estimation helped them check the reasonableness of their answers.

Photo Credit: Sergei25 / Shutterstock.com



Recording Sheet

Round: _____

Thousands	Ones			•	Decimals		
O	H	T	O	•	Tenths	Hundredths	Thousandths

My Estimated Sum: _____

My Actual Sum: _____

My Partner's Sum: _____

Compare the Sums: _____

CONNECT

Writing About Math Reflect on your learning and respond to the questions.

1. How is adding decimals the same as adding whole numbers?
2. How is adding decimals different from whole numbers?

Photo Credit: Sergei25 / Shutterstock.com

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 10

Subtracting Decimals

Quick Code
egm5022

Learning Target

- I can model decimal subtraction.

ACCESS

Fishing in the Nile Valley: Error Analysis Read the paragraph and complete the error analysis.

Egyptians have been fishing since the beginning of civilization along the Nile and its tributaries. Today, many people still fish along the banks and in lakes like Lake Nassar. Tilapia and their predators—the Nile perch, tiger fish, and big catfish—live in Lake Nassar. Some even go on fishing safaris to catch the incredibly large fish that have thrived in this freshwater lake environment.

This Nile perch is 110 centimeters long and more than 5 years old. It weighs 113.39 kilograms.



Nile Perch

Photo Credit: (a) Sergei25 / Shutterstock.com, (b) Cheng Wei / Shutterstock.com

This vundu catfish weighs 38.1 kilograms and is 188 centimeters long.

Wafaa wants to know the total mass of both the vundu catfish and the Nile perch example from the article. She decides to use the algorithm for addition. Here is Wafaa's work:

$$\begin{array}{r} {\scriptstyle 1\ 1} \\ 113.39 \\ +\ \ 38.1 \\ \hline 117.20 \end{array}$$



Vundu Catfish

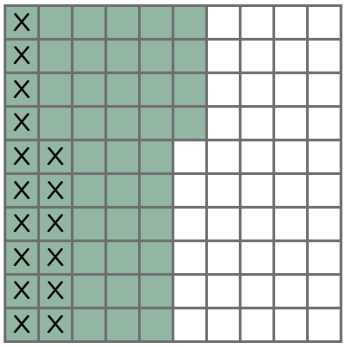
Photo Credit: (a) Sergei25 / Shutterstock.com, (b) Antorn Thongtukit / Shutterstock.com

1. What did Wafaa do correctly?
2. What did Wafaa do incorrectly? Why do you think she made this error?
3. Try to solve the problem correctly.

BUILD

Model Subtraction Follow the directions to solve the problems.

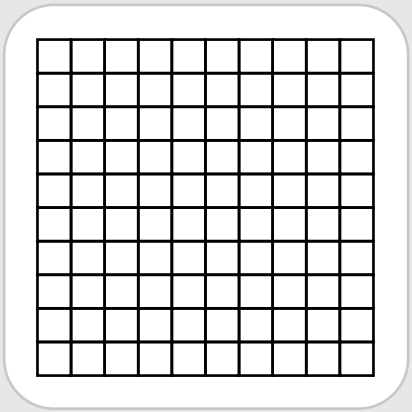
1. The shaded minuend is a decimal number. The *x*'s represent the subtrahend, the number that is subtracted from the minuend. Use the model to solve the subtraction problem.



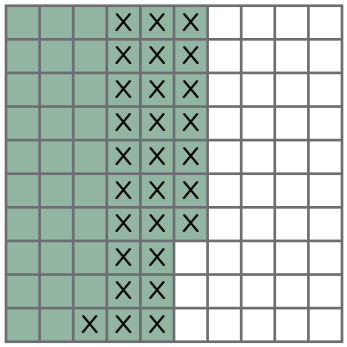
_____ – _____ = _____

Whiteboard: 2. Shade a model to represent the minuend and add *x*'s to represent the subtrahend.

0.1 – 0.09 = _____



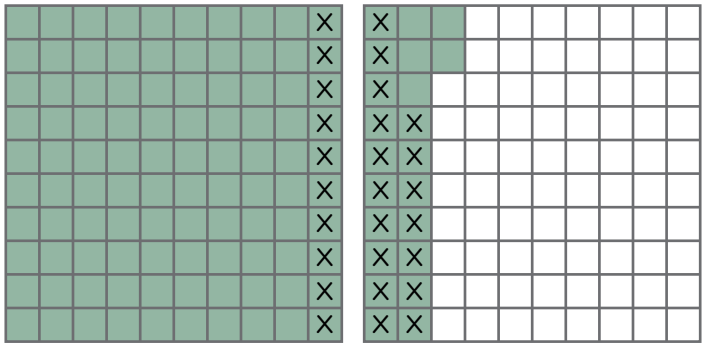
3. Write an expression to match the model. Then, use the model to evaluate the expression.



_____ – _____ = _____

Photo Credit: Sergei25 / Shutterstock.com

4. Write an expression to match the model. Then, use the model to evaluate the expression.



_____ – _____ = _____

Whiteboard: 5. Create a model to match the expression, and then evaluate:

0.39 – 0.13 = _____.

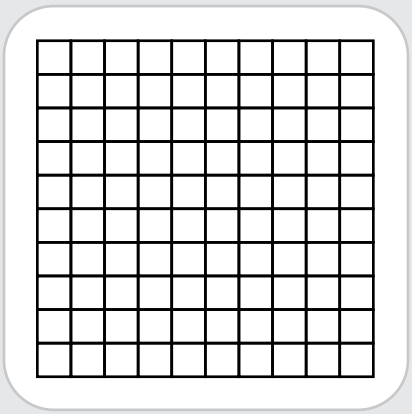
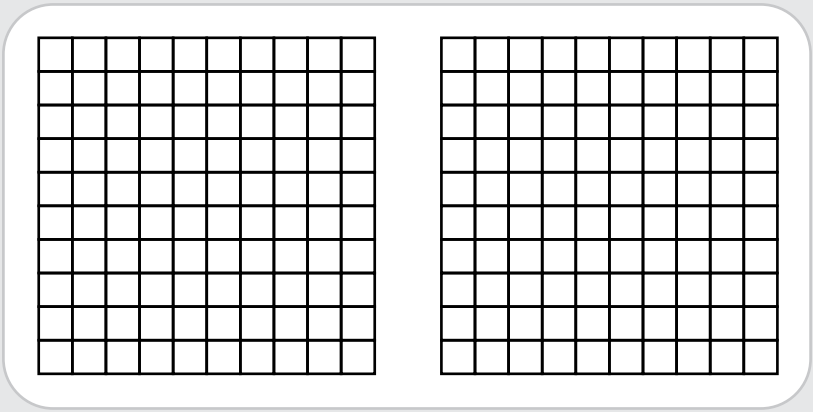


Photo Credit: Sergei25 / Shutterstock.com

Whiteboard: 6. Create a model to match the expression, and then evaluate:

1.23 – 1.02 = _____.



Whiteboard: 7. Create a model to match the expression, and then evaluate:

4.14 – 3.09 = _____.

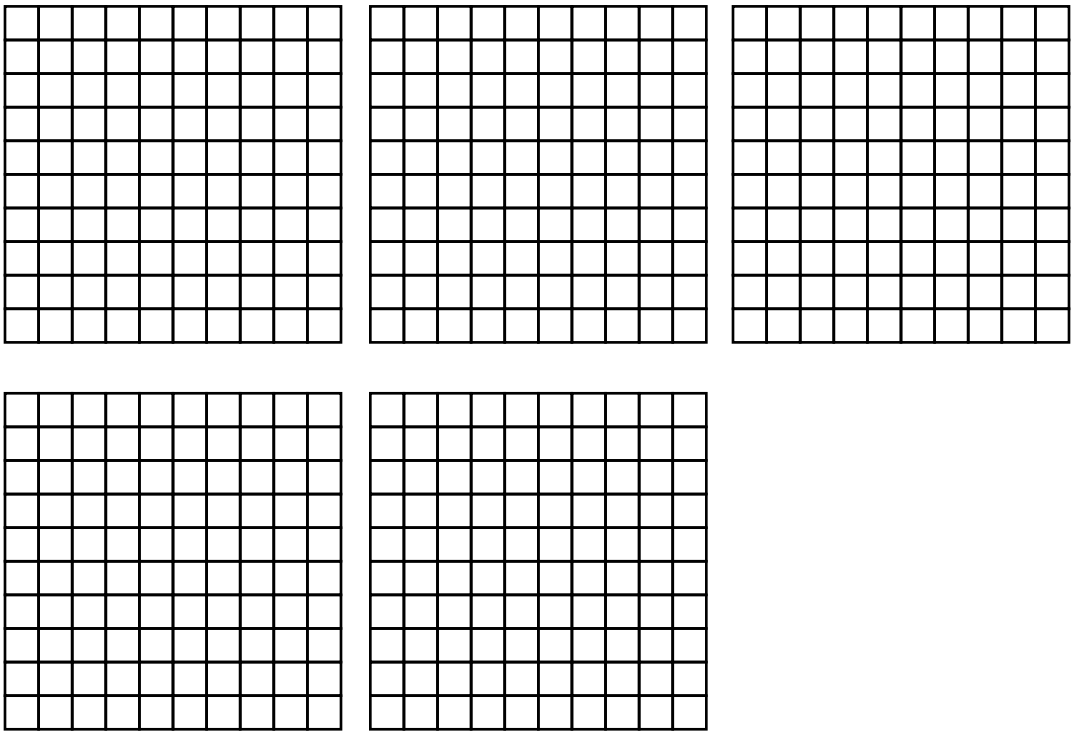
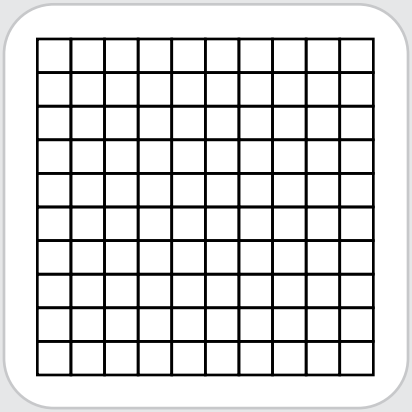


Photo Credit: Sergei25 / Shutterstock.com

Algorithm Connection Follow the directions to solve the problems.

Whiteboard: 1. Create a model for the expression: 0.2 – 0.05 = _____.



2. Record the problem in the place value chart: 0.2 – 0.05 = _____.

Thousands	Ones			•	Decimals		
O	H	T	O	•	Tenths	Hundredths	Thousandths

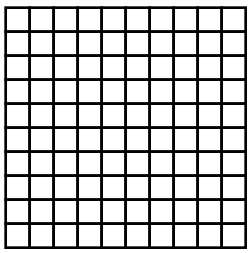
3. Use the model or place value chart to evaluate the expression:

0.2 – 0.05 = _____.

CONNECT

Writing About Math

Explain why adding zeros to the right of the last non-zero digit in a decimal does not change its value. Use the models to help you write your explanation.



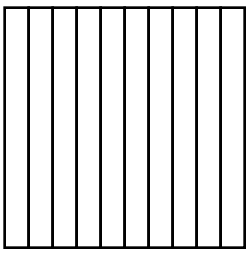


Photo Credit: Sergei25 / Shutterstock.com

LESSON 11

Estimating Decimal Differences

Quick Code
egm5024

Learning Target

- I can estimate **differences** of decimal numbers.

ACCESS

The Nile Delta Read the passage and respond to the question.

As a river begins to descend into another body of water, it sometimes creates a wetland called a delta. Delta is the uppercase Greek letter written as Δ. If you look at the map, you can see how the shape of the letter delta matches the green wetland at the mouth of the river Nile. The Nile Delta begins approximately 20 kilometers north of Cairo and continues 150 kilometers further north until it meets the Mediterranean Sea. About 45 million people live in the Nile Delta region. Al Sharqia is on the eastern edge of the delta. Approximately 7.78 million people live in Al Sharqia.

About how many people live in the Nile Delta, but do not live in Al Sharqia?



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BUILD

A Closer Look at Close Numbers For Problems 1 and 2, use your assigned strategy to estimate the difference. For Problems 3 through 10, use the estimation strategy of your choice. Then, calculate the actual difference.

1. 2.419 – 1.240 Estimate: _____

2. 35.9 – 10.8 Estimate: _____

3. Estimate: 29.98 – 11.99 _____

4. Evaluate: 29.98 – 11.99 = _____

5. Estimate: 0.97 – 0.82 _____

6. Evaluate: 0.97 – 0.82 = _____



Photo Credit: (a) Sergei25 / Shutterstock.com, (b) ntdanai / Shutterstock.com

7. Papyrus once flourished along the banks of the Nile. The plant grows in shallow water marshlands in the Nile Delta and along the Nile Valley in low-lying areas. Maha and Ola are botanists studying the plants along the river Nile. They compare the height of papyrus in different study plots. Use their data table to answer the following questions.

Height of Papyrus in Different Plots				
	Study Plot A	**Study Plot B**	**Study Plot C**	**Study Plot D**
Height in Meters	4.45 meters	4.15 meters	4.32 meters	5.05 meters

Estimate the difference between the heights of papyrus in Study Plot D and Study Plot B. _____

8. Evaluate: 5.05 – 4.15 = _____.

9. Estimate the difference between the height of the papyrus in Study Plot A and Study Plot C. _____

10. Evaluate: 4.45 – 4.32 = _____.

A Reason to Subtract

1. Think of an example from real life where you would need to estimate the difference between 45.30 and 30.20. Write a story problem using the numbers.

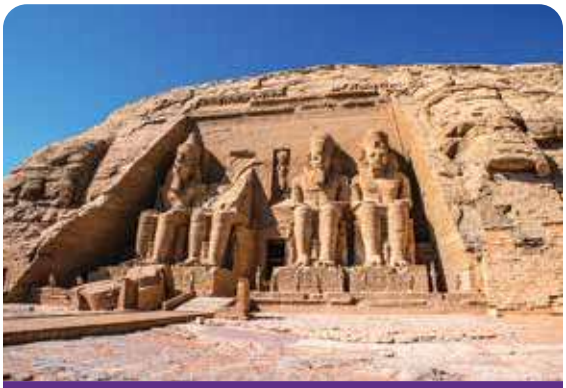
2. Estimate: 45.30 – 30.20 _____

3. Evaluate: 45.30 – 30.20 = _____

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CONNECT

Math around Egypt: Abu Simbel Read the passage and respond to the questions.



The Great Temple



The Small Temple

Abu Simbel is a world-renowned archaeological site that has two temples, The Great Temple and The Small Temple. The temples were carved into the side of a mountain. Each statue at the Great Temple is about 21 meters tall. The Small Temple houses many statues that are each about 12 meters high. To protect them from flooding, the temples were cut into pieces weighing between 2.72 to 18.14 metric tons and moved. After being moved, they were put back together exactly as they had been. The project took almost 5 years and involved about 3,000 workers.

1. Which word(s) indicate that an estimated number was used?

A. built in
B. about
C. might have been
D. weighing between

2. How much taller are the Great Temple statues than the Small Temple statues?

Photo Credit: (a) Sergei25 / Shutterstock.com, (b) Anton_Ivanov / Shutterstock.com, (c) agsaz / Shutterstock.com

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 12

Subtracting to the Thousandths Place

Quick Code
egm5026

Learning Targets

- I can apply strategies to subtract decimals to the Thousandths place.
- I can check the reasonableness of my answers.

ACCESS

A Deeper Dive into Deltas Read to learn more about deltas and then answer the question.

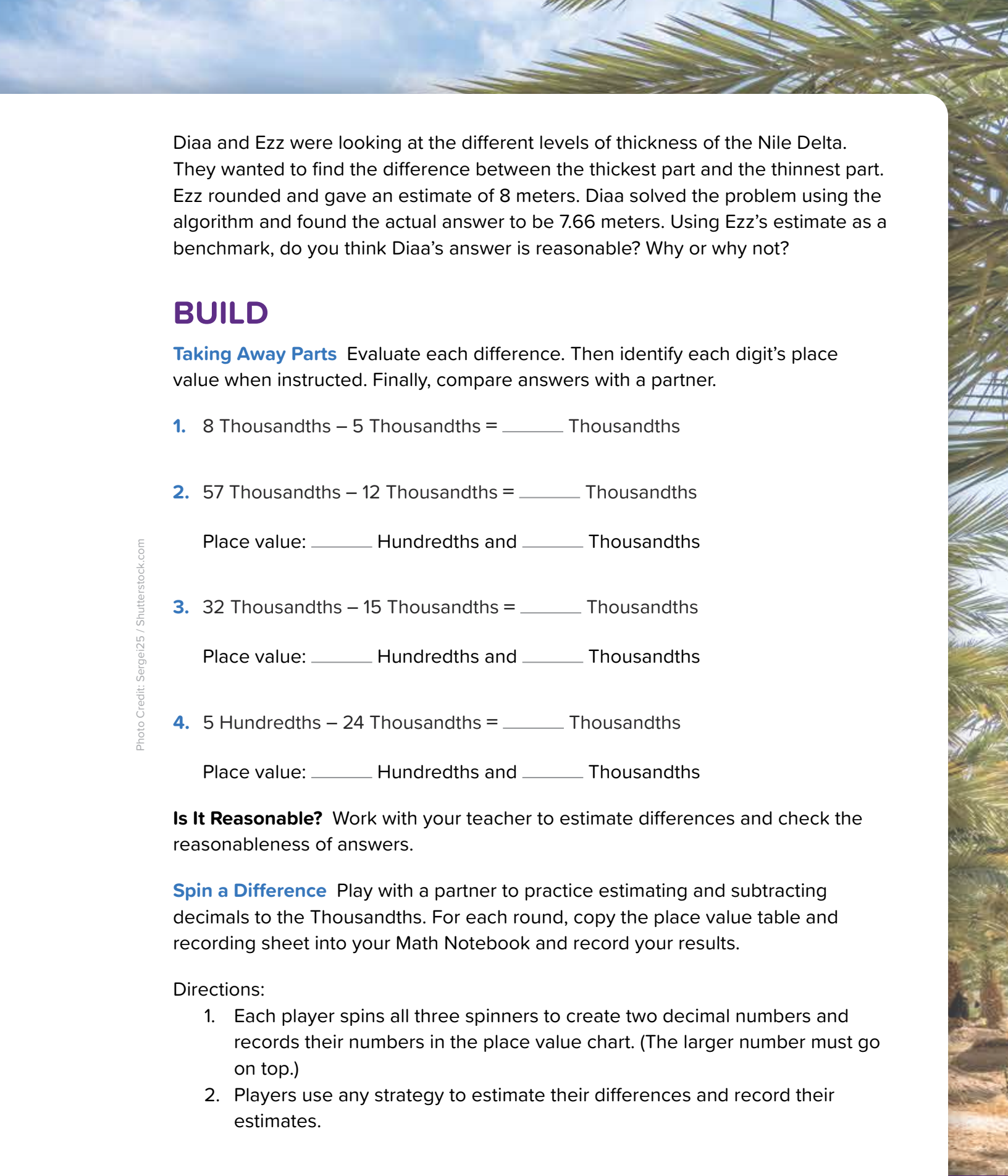
A delta is a landform created by sediment (sand, dirt, and rocks) carried along with the flow of a river until it reaches its mouth. River deltas are important in human civilization because they are major agricultural and population centers. They can provide defense for towns along the shore and impact drinking water supply. They also provide wetland habitats for a variety of species.

The Nile Delta was created by deposits and clay brought from the Ethiopian Plateau. It varies in thickness from 15.24 meters to 22.9 meters and makes up the most fertile soil in Africa. The delta plain extends 160.934 kilometers from north to south, and its widest east–west point is 249.448 kilometers between Damietta and Port Said.



River Nile and Delta at Night

Photo Credit: (a) Sergei25 / Shutterstock.com, (b) Harvepino / Shutterstock.com



Diaa and Ezz were looking at the different levels of thickness of the Nile Delta. They wanted to find the difference between the thickest part and the thinnest part. Ezz rounded and gave an estimate of 8 meters. Diaa solved the problem using the algorithm and found the actual answer to be 7.66 meters. Using Ezz's estimate as a benchmark, do you think Diaa's answer is reasonable? Why or why not?

BUILD

Taking Away Parts Evaluate each difference. Then identify each digit's place value when instructed. Finally, compare answers with a partner.

1. 8 Thousandths – 5 Thousandths = _____ Thousandths

2. 57 Thousandths – 12 Thousandths = _____ Thousandths

 Place value: _____ Hundredths and _____ Thousandths

3. 32 Thousandths – 15 Thousandths = _____ Thousandths

 Place value: _____ Hundredths and _____ Thousandths

4. 5 Hundredths – 24 Thousandths = _____ Thousandths

 Place value: _____ Hundredths and _____ Thousandths

Is It Reasonable? Work with your teacher to estimate differences and check the reasonableness of answers.

Spin a Difference Play with a partner to practice estimating and subtracting decimals to the Thousandths. For each round, copy the place value table and recording sheet into your Math Notebook and record your results.

Directions:

1. Each player spins all three spinners to create two decimal numbers and records their numbers in the place value chart. (The larger number must go on top.)
2. Players use any strategy to estimate their differences and record their estimates.

Photo Credit: Sergei25 / Shutterstock.com

3. Players find the actual differences.
4. Players record all of the differences and compare them using >, <, or =.
5. The player with the lowest difference wins.
6. Players discuss how estimation helped them check the reasonableness of their answers.

Recording Sheet

Round: _____

Thousands	Ones			•	Decimals		
O	H	T	O	•	Tenths	Hundredths	Thousandths

My Estimated Difference: _____

My Actual Difference: _____

My Partner's Difference: _____

Compare the Difference: _____

Photo Credit: Sergei25 / Shutterstock.com

CONNECT

Math around the World: River Deltas Read about two other famous deltas in the world and then answer the questions.



The Ganges Delta



The Mississippi Delta

The Ganges Delta is another famous river delta. It is in the South Asia area of Bangladesh and India. The delta plain is about 350 kilometers wide along the Bay of Bengal. This delta is formed by sediment that washes down from the Himalayan mountains.

In North America, the Mississippi River flows south 3,778.74 kilometers from the state of Minnesota to the Gulf of Mexico. At its widest, the Mississippi Delta is 140.01 kilometers.

1. Order the widths of the three deltas from narrowest to widest.
 (Nile = 249.448 kilometers wide)
2. Find the difference between the width of the Ganges Delta and the width of the Nile Delta.

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Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 13

Decimal Story Problems

Quick Code
egm5028

Learning Target

- I can add and subtract decimal numbers to the Thousandths place to solve story problems.

ACCESS

Tahya Misr Bridge Read the passage and answer the questions.

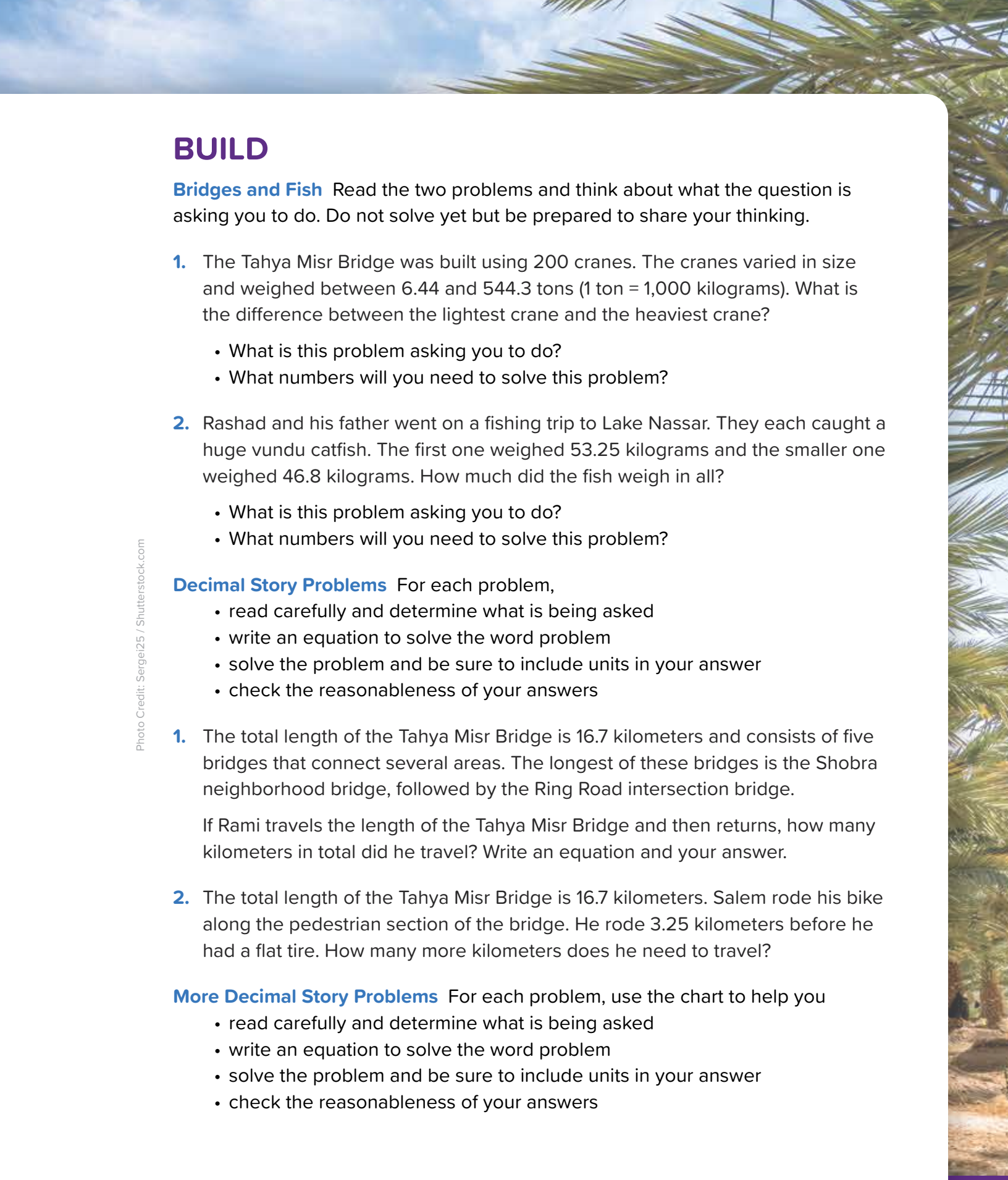


Tahya Misr Bridge

The Tahya Misr Bridge was built in 2016 in Cairo. It serves as a connector across the Nile from northern and eastern Cairo to western Cairo. The bridge is 540 meters long and 67.3 meters wide. It holds the world record for the widest cable-stayed bridge in the world.

The longest cable-stayed bridge is the Jiaxing-Shaoxing Sea Bridge in Japan. Although it is the longest, it is 11.7 meters thinner than the Tahya Misr Bridge. How wide is the Jiaxing-Shaoxing Sea Bridge?

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BUILD

Bridges and Fish Read the two problems and think about what the question is asking you to do. Do not solve yet but be prepared to share your thinking.

1. The Tahya Misr Bridge was built using 200 cranes. The cranes varied in size and weighed between 6.44 and 544.3 tons (1 ton = 1,000 kilograms). What is the difference between the lightest crane and the heaviest crane?
 - What is this problem asking you to do?
 - What numbers will you need to solve this problem?

2. Rashad and his father went on a fishing trip to Lake Nassar. They each caught a huge vundu catfish. The first one weighed 53.25 kilograms and the smaller one weighed 46.8 kilograms. How much did the fish weigh in all?
 - What is this problem asking you to do?
 - What numbers will you need to solve this problem?

Decimal Story Problems For each problem,
- read carefully and determine what is being asked
- write an equation to solve the word problem
- solve the problem and be sure to include units in your answer
- check the reasonableness of your answers

1. The total length of the Tahya Misr Bridge is 16.7 kilometers and consists of five bridges that connect several areas. The longest of these bridges is the Shobra neighborhood bridge, followed by the Ring Road intersection bridge.

 If Rami travels the length of the Tahya Misr Bridge and then returns, how many kilometers in total did he travel? Write an equation and your answer.

2. The total length of the Tahya Misr Bridge is 16.7 kilometers. Salem rode his bike along the pedestrian section of the bridge. He rode 3.25 kilometers before he had a flat tire. How many more kilometers does he need to travel?

More Decimal Story Problems For each problem, use the chart to help you
- read carefully and determine what is being asked
- write an equation to solve the word problem
- solve the problem and be sure to include units in your answer
- check the reasonableness of your answers

Photo Credit: Sergei25 / Shutterstock.com

Nile River Fish	
Name	**Length**
African Tigerfish	104.902 cm
Eel Catfish (Mudfish)	32.7 cm
Marbled Lungfish	201.168 cm
African Knifefish	30.2 cm

1. Ehab and his brother went fishing for 2 days. On the first day, they each caught an African tigerfish. On the second day, Ehab managed to catch a marbled lungfish. What is the total length of 2 tigerfishes and 1 marbled lungfish?
2. Basem is an ichthyologist. He was comparing the longest length of fish in the table to the shortest length of fish. What is the difference in length?
3. Basem collected a sample of three African knifefish. The first one was 29.28 centimeters, the second was 29.255 centimeters, and the third was 35.17 centimeters. What is the difference between the longest and the shortest fish in the sample?

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CONNECT

Math around the World: Famous Bridges Look at the data. Use the numbers from the chart to write a story problem. Swap problems with a partner and solve each other's story problems.

Bridge Name	Location	Width (in meters)
Tahya Misr	Egypt	67.3
Pont de Normandie	France	23.6
Tatara Bridge	Japan	30.6
Queensferry Crossing	United Kingdom	32.918


Photo Credit: Sahel25 / Shutterstock.com

UNIT

2

Theme 1 | Number Sense and Operations

Unit 2
Number Relationships

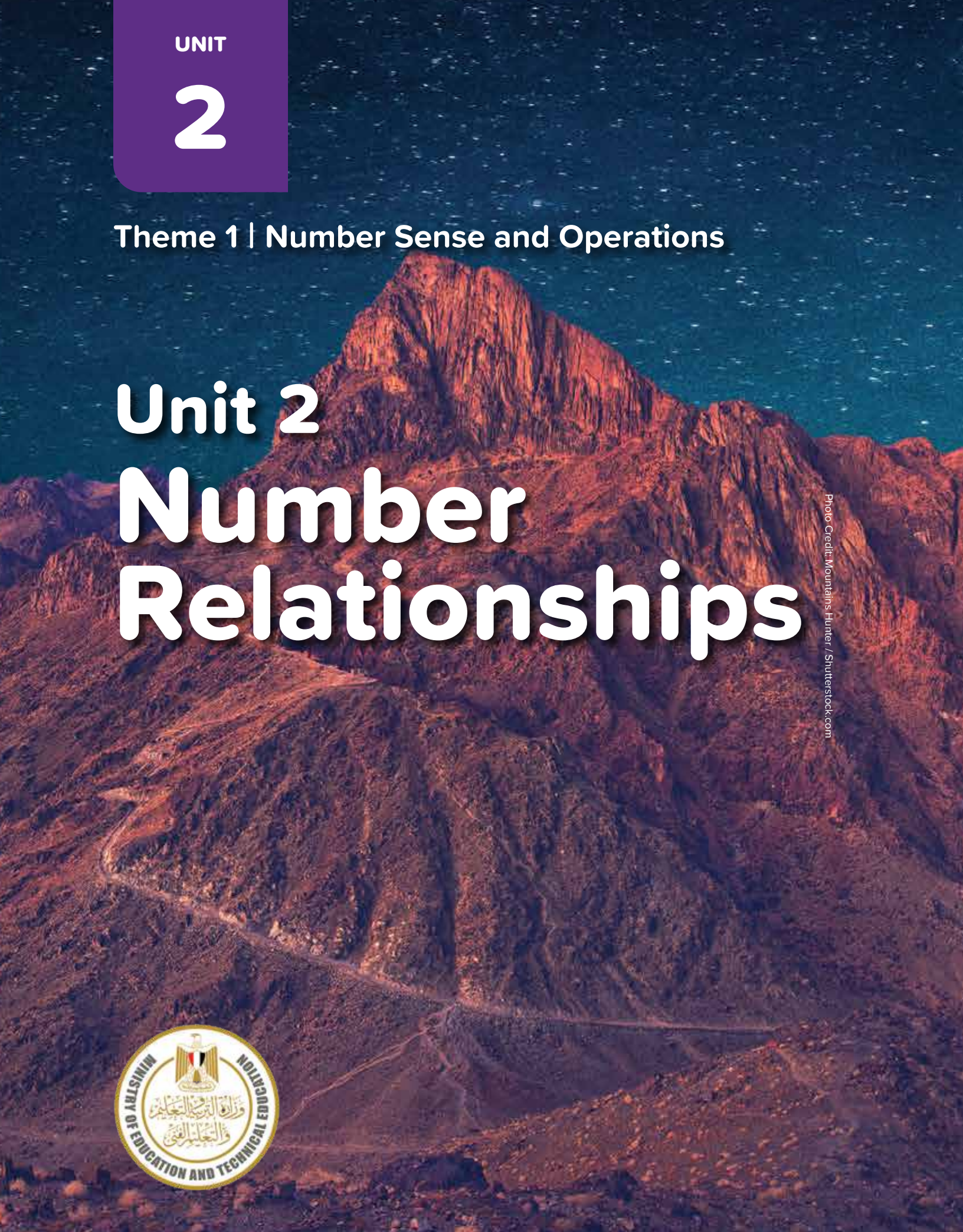


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MINISTRY OF EDUCATION AND TECHNICAL EDUCATION



Grand Egyptian Multiples

Unit Video Questions

Quick Code
egm5031

The Unit 2 Opener Video, Grand Egyptian Multiples, explores math around Egypt through number relationships. In this unit, you will learn how numbers tell stories about the world around you through expressions and equations. You will also explore relationships between factors and multiples.

- ☐ How did the students use number relationships to make sense of the world around them?
- ☐ What did the students find out about factors and multiples?

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CONCEPT
1

Expressions, Equations, and the Real World

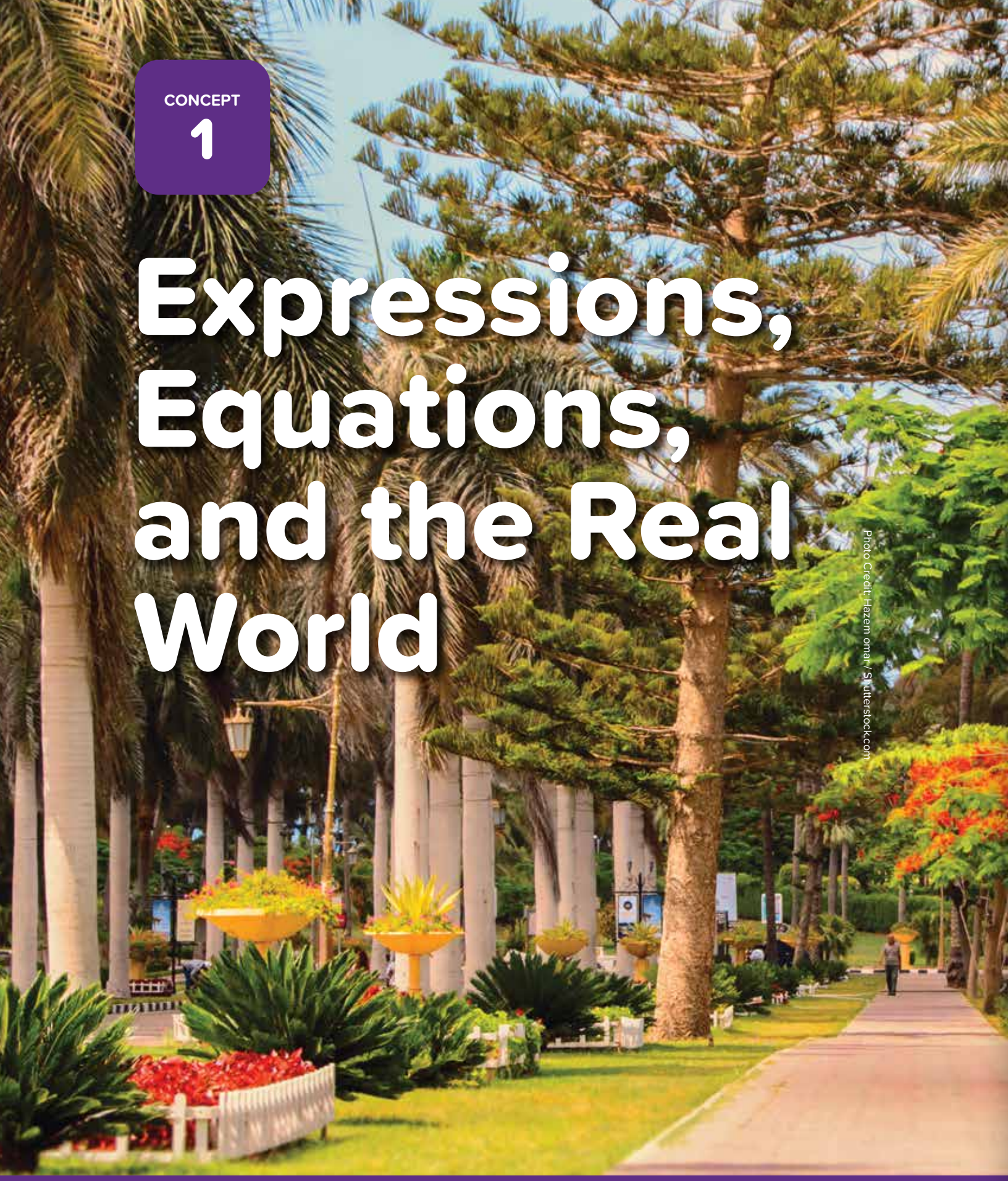


Photo Credit: Hazem omar / Shutterstock.com

LESSON 1

Expressions, Equations, and Variables

Quick Code
egm5033

Learning Targets

- I can explain the **difference** between expressions and equations.
- I can explain why there might be an **unknown** in an **expression** or **equation**.
- I can use letters or symbols to represent unknowns in expressions and equations.

ACCESS

East of Cairo Work with your teacher to read the passage. Then, respond to the questions.



Sinai Peninsula

One of the major geographical regions in Egypt is Sinai Peninsula. A peninsula is a large area of land that is almost surrounded by water. Sinai Peninsula is triangular and has an area of about 60,000 square kilometers. It is connected to Africa on the west by the Gulf of Suez, which is approximately 275 kilometers long. On the east it is connected to Asia by Aqaba Gulf that is approximately 180 km long. There are approximately 600,000 people living on Sinai Peninsula.

Photo Credit: (a) Hazem omar / Shutterstock.com, (b) otorongo / Shutterstock.com

1. Mariam wrote two equations to compare the lengths of the two gulfs. Here are her equations.

 - $180 + x = 275$
 - $275 - 180 = x$

 What does the letter x represent in these equations?

 A. the length in kilometers of one gulf

 B. the difference in kilometers between the two lengths

 C. the width of Sinai Peninsula

 D. the distance in kilometers between the gulfs

2. If Mariam were to solve both of these equations correctly, what would be true? Select the two correct answers.

 A. The value of x would be the same.

 B. The answer to $275 - 180$ would be 85 km.

 C. The difference between the two lengths would be 95 km.

 D. The distance in kilometers between the gulfs would be 95 km.

BUILD

What Does the Variable Mean? Read each problem and determine what the variable represents.

1. Basma wanted to write an equation with a variable to represent "12.5 plus a number equals 15." Which of the following would be correct?

 A. $12.5 + 15 = x$

 B. $12.5 + x = 15$

 C. $15 + x = 12.5$

 D. $15 - x = 12.5$

Photo Credit: Hazem omar / Shutterstock.com

2. Adham was comparing the heights of sand dunes in the northern part of Sinai Peninsula in meters. He wrote the equation 27 m – 18 m = x. What does the x represent?

 A. the height of one of the dunes in Sinai

 B. the sum of the heights of two dunes in Sinai

 C. the difference between the tallest and shortest sand dunes

 D. the distance between the tallest and shortest sand dunes

3. If Farha knew that the sum of the heights of two sand dunes is 46 meters and one of the dunes is 18.25 m high, which equation could she write to find the unknown height? Select the two correct answers.

 A. $18.25 + x = 46$

 B. $18.25 + 46 = x$

 C. $46 - 18.25 = x$

 D. $x - 18.25 = 46$

4. Ehab wrote the equation $42.7 + 38.3 = x$. If each of the numbers represents the height of one of the dunes, what does x represent?

 A. the height difference between the dunes

 B. the sum of the heights of both dunes

 C. the height of the taller dune

 D. the distance between the dunes



Sand Dunes

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Equations and Expressions Work with your teacher and classmates to compare the problems. Look at the problems. How are they similar? How are they different?

$3.6 + 1.6 = x$	$14.78 - 3.4$	$7.5 + 3.65$
$25.6 - 9$	$14 \times 7 = x$	$9 - x = 3.5$

Equation or Expression? Check your understanding of equations and expressions.

1. Read the mathematical phrases. Sort them into Equations, Expressions, or Neither.

 - $4.7 + 3.6 = M$
 - $6.4 + 3.2 + 8$
 - $125 - 27.3$
 - $56 - x = 47.5$
 - $3.4 + L$
 - Aya ran a total of 8 km last week. She ran 3.75 km on Monday. How much did she run the rest of the week?
 - $345.45 - 123.8 = x$
 - $3.5 + 2.456 = 2.5 + 3.456$
 - $14.2 - 3.575$
 - $37.125 - 13.7$
 - Amir had 3.5 kg of apples and 2.7 kg of figs.
 - $7.3 + 4.5 + 2.3 = A$

Equations	Expressions	Neither

Photo Credit: Hazem omar / Shutterstock.com

CONNECT

Writing About Math Read and respond to the questions. Be prepared to share your thinking.

1. Is $4.5 + 6.25 = x$ the same as $4.5 + 6.25 = M$? Why or why not?
2. Is $2.34 + 6 = 1.34 + 7$? Why or why not?

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 2

Variables in Equations

Quick Code
egm5035

Learning Target

- I can apply the relationship between addition and subtraction to find the value of the unknown in an equation.

ACCESS

Number Talk Use mental math to solve the problems provided by your teacher. Be prepared to share how you solved them.

BUILD

Into the Unknown First, use mental math to estimate and then solve the equations. Use a place value chart, if needed.

1. $8.23 + p = 10.24$

 $p =$ _____

2. $T - 2.45 = 0.26$

 $T =$ _____

3. $2.45 + n = 5.24$

 $n =$ _____

4. $V + 42.89 = 100.01$

 $V =$ _____

5. $h - 6.82 = 1.23$

 $h =$ _____

6. $j - 12.40 = 3.01$

 $j =$ _____

7. $5.52 + 2.01 + m = 9.21$

 $m =$ _____

8. $2.30 + 3.10 = 1.50 + v$

 $v =$ _____

Photo Credit: Hazem omar / Shutterstock.com

9. Faten wants to fill a bag with 0.50 kilogram of lettuce. Her bag weighs 0.38 kg. How many more kilograms of lettuce does she need?

What would the variable in the problem represent? Solve the problem.

10. Ezz ran three days last week. He ran 5.24 kilometers on Monday and 6.50 km on Wednesday. If he ran a total of 15 km for the week, how much did he run on Friday?

What would the variable in the problem represent? Solve the problem.

CONNECT

Math around Egypt: Ras Muhammad National Park Work with your teacher to read the passage. Then, respond to the question.



Ras Muhammed National Park

The Ras Muhammad National Park is located in the south of Sinai Peninsula. The park has acacia trees, doum palms, and grasses. The area of the Red Sea inside the park has over 1,000 species of fish. It also has 220 species of coral reefs that are important to both sea life and humans. The total area of the park, including its marine and land surface area is 480 square kilometers. If the marine area is 345 km^2, how large is the surface area of the land in the park?

1. What would the variable represent in this equation?

2. Estimate the answer.

3. Solve the problem.

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LESSON 3

Finding the Unknown

Quick Code
egm5037

Learning Targets

- I can solve equations involving decimal numbers to the Thousandths place.
- I can write equations to represent story problems with unknown quantities.

ACCESS

Variables in Perimeter If the perimeter of this shape is 16.70 meters, what does x equal?

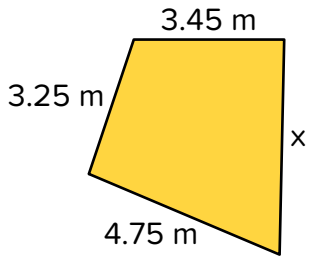


Photo Credit: Hazem omar / Shutterstock.com

BUILD

Variables in the Thousandths

1. $2.342 + n = 3.418$
2. $w - 4.143 = 6.150$
3. $5.253 + p = 10.420$
4. $c - 3.425 = 2.520$
5. $23.024 + k = 25.130$
6. $x - 1.241 = 0.213$
7. $3.41 - c = 1.782$

Writing Equations to Match Write an equation to represent the story problems using x as the variable. Use a part-to-whole bar model (as shown) to help you. (You are not solving the equations at this time.)

Whole:	
Part:	Part:

1. Basem is taking a bus from Cairo to Ras Muhammad National Park to visit the coral reefs. The total journey is 492.64 kilometers. After 396.48 km, the bus stops in El Tor to pick up more passengers. How far is El Tor from Ras Muhammad National Park?

2. Basem and his friend Jana were snorkeling in Ras Muhammad National Park on the coral reef. Basem saw a hawksbill sea turtle that was 0.78 meter long. Jana saw a green turtle that was 0.58 m longer. How long was the green turtle?

3. In Jana's backpack she has a water bottle that weighs 1.5 kilograms, books that weigh 2.451 kg, and a snack. Her filled backpack weighs 4.535 kg. How much does her snack weigh?

4. At the market, Basem bought two melons for a total weight of 2.64 kilogram. If one melon weighed 1.36 kg, what was the weight of the other melon?

Photo Credit: Hazem omar / Shutterstock.com

CONNECT

Math around Egypt: Coral Reefs Work with your teacher to read the passage. Then, answer the questions.



Coral Reef

Coral reefs, like those in Ras Muhammad National Park, are very important to the planet. Like the rain forests in the Amazon, coral reefs are responsible for much of Earth's biodiversity, or variety of life. It is estimated that reefs contain 25 percent of all marine animals.

Can this problem be solved with addition, subtraction, or both?

Jana and Basem are taking a boat to dive the reefs. Their entire trip will last 3.5 hours. If it takes them 1.25 hr to prepare and get to the reef, how long will they have to dive?

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Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 4

Telling Stories with Numbers

Quick Code
egm5039

Learning Targets

- I can write story problems involving addition and subtraction of decimal numbers.
- I can solve equations involving decimal numbers to the Thousandths place.

ACCESS

Error Analysis Read the problem and complete the error analysis.

Most years, the northern region of Sinai Peninsula gets 12.5 centimeters of precipitation in the winter. Last year it received only 9.17 cm. What is the difference between the two amounts?

Taha read this problem, wrote the following equation, and solved it. Analyze Taha's work. Identify what he did correctly and incorrectly, then try to solve the problem.

$12.5 + 9.17 = x$ $\qquad\qquad$ $x = 21.67$ cm

1. What did the student do correctly?
2. What did the student do incorrectly? Why do you think he made this error?
3. Try to solve the equation $12.5 + 9.17 = x$. Is this the correct equation to solve the problem? Explain your thinking.

BUILD

What Is the Equation? Read the story problems and follow the directions given by your teacher.

A. Ola needed 10 meters of wood to build a garden bed. She found 3.5 m in her garage. How many more meters of wood does she need for the bed?

B. Nagi is training for a race. Each day of the week he runs 3.5 kilometers. If he runs for 10 days, how far will he have run?

Work with a partner to write a story problem that is modeled by this equation: $2.8 + 1.5 = C$.

Photo Credit: Hazem omar / Shutterstock.com

What Is the Story?

1. Write a story problem for the equation and then solve: $x + 2.75 = 12.5$.

2. Write a story problem for the equation and then solve: $124.6 - 72.25 = m$.

3. Write a story problem for the equation and then solve: $34.750 - s = 15.25$.

Photo Credit: (a) Hazem omar / Shutterstock.com, (b) A.Pushkin / Shutterstock.com

CONNECT

Math around Egypt: Mount Sinai

Work with your teacher to read the passage. Then, answer the questions.

Tens of thousands of visitors travel each year to climb Jebel Mūsā, or Mount Sinai. There are two paths to reach the summit. The first path can take anywhere from $\frac{3}{4}$ of an hour to 3 hours to climb. The second path usually takes about 2.5 hr to walk.



Climbing Mount Sinai

Use the information in the passage to write a story problem to match the equation, and then solve: $1.25 + x = 2.5$.

Check Your Understanding

Follow your teacher's instructions to complete this activity.

CONCEPT
2

Factors and Multiples

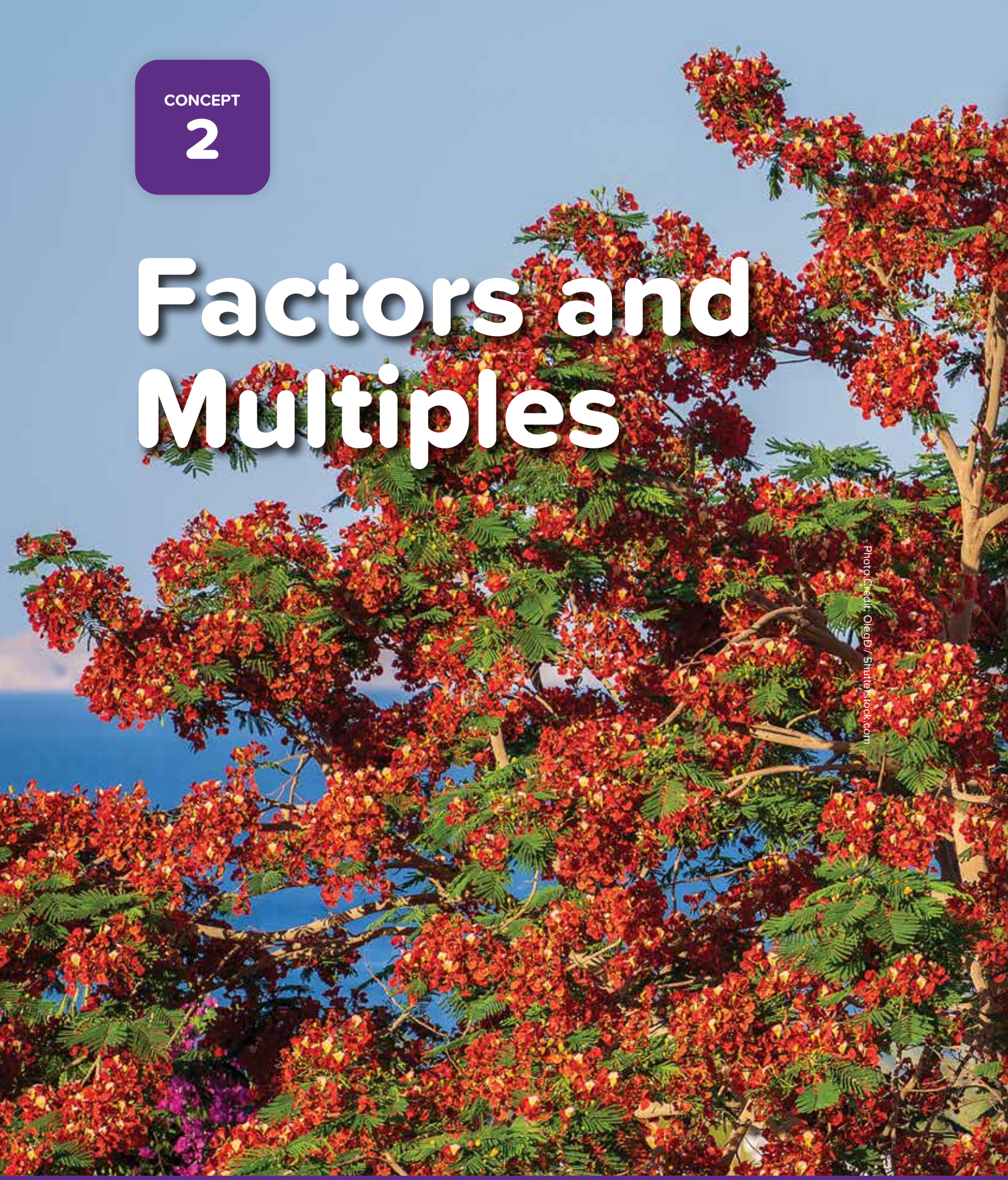


Photo Credit: OlegD / Shutterstock.com

LESSON 5

Finding Factors

Quick Code
egm5042

Learning Targets

- I can explain the meaning of **factors**.
- I can identify the factors of a given number.

ACCESS

Crossing Sinai Read the passage and respond to the questions.



Beach Resort

Most cities in Sinai are along the coast of Sinai Peninsula. Some of the cities are popular holiday destinations.

Photo Credit: (a) OlegD / Shutterstock.com, (b) Oleg_P / Shutterstock.com

1. A bicycle race was planned from Sharm El Sheikh to Taba along the Gulf of Aqaba. The distance by road is about 220 kilometers. The riders wanted to break up the ride into equal, whole-kilometer portions for rest and water stops. Which of the following distances would divide the entire ride into equal, whole-kilometer distances? Choose the two distances that the riders could use.

 A. 10 km

 B. 12 km

 C. 20 km

 D. 25 km

 E. 50 km

2. What other ways could the distance be divided into equal parts?

BUILD

What Is a Factor? Follow your teacher's directions to complete the problems.

1. Look at the chart and talk to a partner about what you notice. What patterns do you see? Record your thinking.

91	92	93	94	95	96	97	98	99	100
81	82	83	84	85	86	87	88	89	90
71	72	73	74	75	76	77	78	79	80
61	62	63	64	65	66	67	68	69	70
51	52	53	54	55	56	57	58	59	60
41	42	43	44	45	46	47	48	49	50
31	32	33	34	35	36	37	38	39	40
21	22	23	24	25	26	27	28	29	30
11	12	13	14	15	16	17	18	19	20
1	2	3	4	5	6	7	8	9	10

Photo Credit: OlegD / Shutterstock.com

2. Select Yes or No to indicate whether each value is a factor of the given number.

Number	Is 2 a factor?	Is 5 a factor?	Is 4 a factor?
A. 40	Yes No	Yes No	Yes No
B. 12	Yes No	Yes No	Yes No
C. 35	Yes No	Yes No	Yes No
D. 17	Yes No	Yes No	Yes No

3. List all of the factors of 15.

4. Fill in the missing factors represented by the variables.

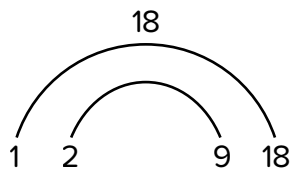
$4 \times m = 16$ $m =$ _____

$v \times 15 = 45$ $v =$ _____

$6 \times t = 42$ $t =$ _____

$p \times 9 = 72$ $p =$ _____

5. Ahmed created this factor rainbow for 18. What factors did he forget?



A. 8 and 10

B. 5 and 3

C. 4 and 4

D. 3 and 6

Photo Credit: OlegD / Shutterstock.com

6. Azza was traveling from St. Katerine to El Tor on the coast. She made 24 cookies for the trip and wants to put them into bags for her siblings. Choose the set that lists ways she could divide the cookies into bags without any leftovers.

 A. 2, 4, 5, 6, and 8 bags

 B. 3, 5, 7, 10, and 12 bags

 C. 2, 3, 4, 6, 8, and 12 bags

 D. 3, 4, 6, 10, and 12 bags

7. Osman was trying to determine all of the factors of 17. The only factor pair he could find was 1 and 17. Did he find all the factors? How do you know?

CONNECT

Math around Egypt: Gulf of Suez Work with your teacher to read the passage. Then, answer the questions.



Suez Gulf

Photo Credit: (a) OlegD / Shutterstock.com, (b) byvalet / Shutterstock.com

The Gulf of Suez is the northwest arm of the Red Sea between Africa and Sinai Peninsula. The approximate length of the Gulf of Suez from its mouth at the Strait of Jubal to its head at the city of Suez is 314 kilometers. It varies in width from 19 km to 32 km and is linked to the Mediterranean Sea by the Suez Canal. The gulf is an important shipping route.

1. Could you divide the width of 19 kilometers into smaller equal distances? What would the length of each distance be?
2. Could you divide the width of 32 kilometers into smaller equal distances? What would the lengths of some of the distances be?
3. How is finding factors similar to dividing numbers into equal parts?

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 6

Prime Factorization

Quick Code
egm5044

Learning Target

- I can use a **factor tree** to identify the **prime** factors of a given number.

ACCESS

Prime versus Composite Read the question and choose the answer from the options given.

What is the best explanation for the difference between prime and composite numbers?

A. A prime number has only 2 factors: 1 and itself. A composite number has more than two factors.

B. A prime number has only 1 as a factor and a composite number has two factors.

C. A prime number has only 2 factors. A composite number has 4 or more factors.

D. A prime number can be factored in more than one way. A composite number can be factored in only one way.

Prime or Composite Pop Up Play the game as directed.

Directions:

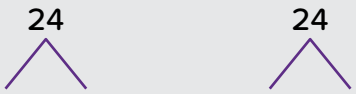
- Your teacher will say a number.
- If it is a **prime number**, pop up (stand).
- If the number is **composite**, stay seated and then share a **factor pair** other than 1 and the number with a partner.

Photo Credit: OlegD / Shutterstock.com

BUILD

Whiteboard: Exploring Factor Trees Work with your teacher to complete the factor trees.

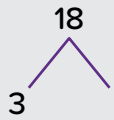
Complete the factor trees by filling in the missing factors in your journal or using the digital tool.



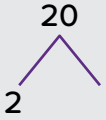
Whiteboard: Prime Factorization

- Complete each of the factor trees (one of the factors is already listed).
- Decompose the composite factors until only prime numbers remain.
- Circle the prime factors. Draw a square around the composite factors.
- Record the prime factorization for each factor tree.
 (Example: $24 = 2 \times 2 \times 2 \times 3$)

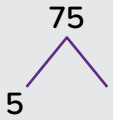
1.



2.



3.



Products of Prime Factors Find the product of the prime factorization listed. Then, list all other factors of the product.

1. $2 \times 2 \times 5 =$ _____

Other factors:

2. $2 \times 3 \times 7 =$ _____

Other factors:

3. $2 \times 2 \times 2 \times 7 =$ _____

Other factors:

Photo Credit: OlegD / Shutterstock.com

CONNECT

Math around Egypt: The Suez Canal Work with your teacher to read the passage. Then, answer the questions.



Suez Canal

Photo Credit: (a) OlegD / Shutterstock.com, (b) Intrepix / Shutterstock.com

At the northern edge of the Gulf of Suez lies the Suez Canal. The Suez Canal extends 193 kilometers and cuts thousands of miles from the shipping routes between Europe and Asia. Before the canal was built, ships had to sail all the way around the southern tip of Africa. Now, they can pass directly from the Red Sea to the Mediterranean Sea.

1. It takes 12 to 16 hours for a ship to go through the canal. Akram was curious. If a ship takes 12 hr and travels 193 kilometers, can it go an equal distance each hour? To solve the problem, he needs to know if 12 is a factor of 193. He makes a factor tree starting with 1 and 193. Basem told him the factor tree would not help him answer his question. Is Basem correct or incorrect? Why?
2. Is 193 prime or composite?
3. Is 12 a factor of 193? How do you know?
4. Is 1 prime or composite or neither? Why?

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 7

Greatest Common Factors

Quick Code
egm5046

Learning Targets

- I can use factor trees to identify **common factors** of two whole numbers.
- I can use factor trees to identify the **greatest common factor** of two whole numbers.

ACCESS

Diving in the Red Sea Work with your teacher to read the passage and respond to the questions.



Free Divers

Scuba diving is a popular tourist attraction in the Red Sea. One of the more popular dives is to an 80-meter-long steamship that sank in 1876 when it got stuck on a reef south of Sharm El Sheikh. The crew worked for 14 hours to dislodge the boat, but it capsized and sank to the seabed 30 meters below. The interior of the ship is filled with soft corals, black corals, and a variety of fish. The outside of the ship is covered with hard corals, and a variety of fish can be found swimming inside and outside the ship.

Photo Credit: (a) OlegD / Shutterstock.com, (b) Dudarev Mikhail / Shutterstock.com

1. Shadi and Taha went diving to the steamship. They each stopped at intervals of equal depths to check their gear. Shadi dove to the stern at 30 meters below the surface. What are all the options of intervals he could take? (Stopping every 1 m is not practical, nor is going the entire distance.)

 A. 2 m, 3 m, 5 m

 B. 2 m, 3 m, 5 m, 6 m

 C. 2 m, 3 m, 5 m, 6 m, 10 m, 15 m

 D. 2 m, 3 m, 5 m, 6 m, 10 m, 12 m

2. Taha dove to the hull at a depth of 15 meters. What are the options of intervals he could take? (Stopping every 1 m is not practical, nor is going the entire distance.)

 A. 3 m, 5 m

 B. 2 m, 3 m, 5 m

 C. 2 m, 3 m, 5 m, 6 m

 D. 2 m, 3 m, 5 m, 6 m, 10 m

Challenge If both divers stop at equivalent equal intervals, what is the greatest distance they can both dive before stopping?

 A. 2 m

 B. 3 m

 C. 5 m

 D. 10 m

Photo Credit: OlegD / Shutterstock.com

BUILD

What Do They Have in Common? Read and complete each problem.

1. List the factors of 20.

2. List the factors of 28.

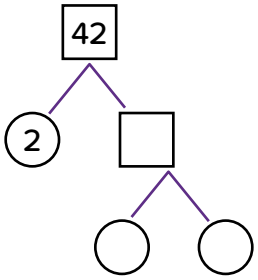
3. What is the product of the following prime numbers? $2 \times 3 \times 3 =$ _____

4. What is the product of the following prime numbers? $3 \times 3 \times 5 =$ _____

Greatest Common Factors Work independently to complete the problems.

1. List the factors of 42.

2. Complete the factor tree for 42 and write out the prime factorization.



3. Find the value of n : $n = 2 \times 2 \times 7$

4. What are common factors of 42 and n?

5. What is the greatest common factor of 42 and n?

6. Two groups took public transportation in Sharm El Sheik. Each ticket costs the same amount of money. One group spends 16 LE and the other group spends 12 LE. At most, how much does each ticket cost? (Hint: Use the GCF.)

 A. 2 LE

 B. 4 LE

 C. 6 LE

 D. 8 LE

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CONNECT

Writing About Math Explain in your own words what you know about prime factorization and how it helps you find the greatest common factor of two numbers. What relationships are revealed by breaking numbers into factors?

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 8

Identifying Multiples

Quick Code
egm5048

Learning Targets

- I can explain the meaning of **multiples**.
- I can identify common multiples of two whole numbers up to 12.

ACCESS

Ras Abu Galum Work with your teacher to read the passage. Then, answer the questions.



Ras Abu Galum

In the northeast corner of Sinai, along the Gulf of Aqaba, is the Ras Abu Galum Protectorate. This part of Sinai is unique because it has a variety of terrain and habitats. There are mountains, coral reefs, lagoons, deserts, and mangrove trees.

1. Omar wants to take the bus to visit this region. During the week, a bus leaves for Ras Abu Galum at 3 a.m. Additional buses leave every 3 hours. The last bus leaves at 12 p.m. What times can Omar catch the bus?

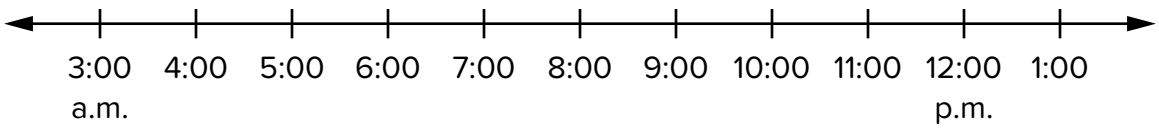
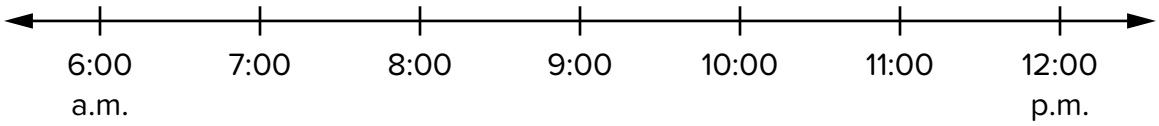


Photo Credit: (a) OlegD / Shutterstock.com, (b) otorongo / Shutterstock.com

2. On the weekend, the first bus leaves for Ras Abu Galum at 6 a.m. Additional buses leave every 2 hours until 12 p.m. What times can Omar catch the weekend bus?



3. What times can Omar always catch a bus, whether it is a weekday or the weekend?

BUILD

Skipping Along Complete the following.

1. List the first five multiples of 6.
2. List the first six multiples of 7.
3. List eight multiples of 10.
4. Adel is buying cartons of eggs and bottles of juice at the supermarket to make breakfast for friends. Each carton contains 12 eggs. Complete the chart for Adel.

Cartons	1	2	3	4	5	6
Eggs	12					

5. The juice comes in packs of 9. Complete the chart for Adel.

Packs	1	2	3	4	5	6
Juice	9					

6. If Adel is buying enough eggs and juice for 36 people, how many cartons of eggs and packs of juice will he need to buy for each guest to have 1 egg and 1 juice?

Common Multiples Complete the following.

1. List the first five multiples of 5.

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2. List the first ten multiples of 2.

3. What common multiples of 2 and 5 did you list?

4. List the first five multiples of 8.

5. List the first six multiples of 4.

6. List the first five multiples of 6.

7. What common multiples of 8, 4, and 6 did you list?

8. List the first twelve multiples of 3.

9. List the first twelve multiples of 4.

10. What common multiples of 3 and 4 did you list?

11. Use this information to fill in the Venn Diagram for the first 12 multiples of 3 and 4, placing the common multiples in the shared center.

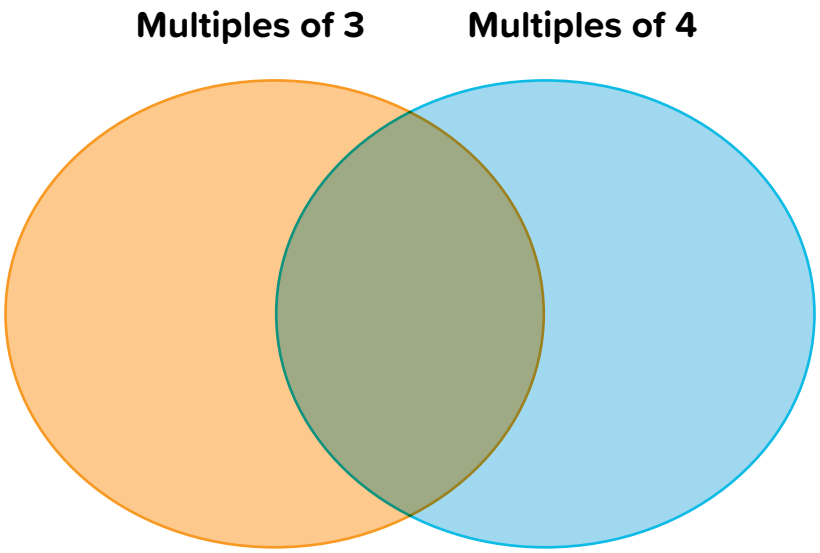


Photo Credit: OlegD / Shutterstock.com

12. Select the three numbers that are NOT common multiples of 5 and 7.

A. 14
B. 21
C. 35
D. 55
E. 70
F. 105

13. Select the three numbers for which 24 and 32 are common multiples.

A. 2
B. 3
C. 4
D. 6
E. 7
F. 8

14. Doha and her little brother are laying out train tracks. Each train track is 12 centimeters long. How long are the first 5 pieces of track laid end to end?

15. How many pieces of track would Doha and her brother need to make the same distance from Problem 14 if the track pieces were 4 centimeters long?

CONNECT



Pier in Taba

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Writing About Math Read the question and respond in your math notebook. Be prepared to share your thinking with the class.

Aya thinks a number can have unlimited multiples but a limited number of factors. Do you agree or disagree? Explain your thinking.

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 9

Least Common Multiple

Quick Code
egm5050

Learning Targets

- I can explain the meaning of **least common multiple**.
- I can identify the least common multiple of two whole numbers up to 12.

ACCESS

Vocabulary Check-In Fill in the blanks with the vocabulary terms from the word bank. You may use a term more than once.

prime	**factor**	**one**
composite number	**product**	**multiples**

1. A _____ is a number with more than one set of factor pairs.
2. A _____ is a number multiplied by another number to find a product.
3. Skip counting is a way to find _____ of a number.
4. _____ is a factor of all numbers.
5. A _____ number's only factor pair is one and itself.
6. A _____ is the answer to a multiplication problem.

Photo Credit: OlegD / Shutterstock.com



Using Vocabulary Complete the following.

1. Give an example of a prime number.
2. Write a multiplication equation. Label the factors and the product.
3. Give an example of a composite number with at least two factor pairs. Write the factor pairs for the number.

BUILD

Least Common Multiple List at least three multiples of each number, then find the least common multiple (LCM) for each pair of numbers. If you do not find the LCM in the first three multiples, continue to list multiples until you find one.

1. 6 and 9

 Multiples of 6: _____

 Multiples of 9: _____

 LCM: _____

2. 2 and 3

 Multiples of 2: _____

 Multiples of 3: _____

 LCM: _____

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3. 10 and 5

Multiples of 10: _____

Multiples of 5: _____

LCM: _____

4. 3 and 8

Multiples of 3: _____

Multiples of 8: _____

LCM: _____

5. 5 and 11

Multiples of 5: _____

Multiples of 11: _____

LCM: _____

6. 5 and 6

Multiples of 5: _____

Multiples of 6: _____

LCM: _____

Challenge Find the LCM of 7, 6, and 12. _____

Photo Credit: OlegD / Shutterstock.com



LCMs in the Real World List multiples to solve the problems. Fill in the charts and use the information to help you solve the problems.

1. Badr is buying kofta and aish baladi for his birthday party. The kofta is sold in packages of 3. The bakery sells the aish baladi in packages of 12. Badr wants to have exactly the same number of each. What is the minimum number of kofta and aish baladi he should buy?

Package	1					
Kofta	3					

Package	1					
Aish Baldi	12					

2. Hend and Jana are biking around a small lake. Hend makes a complete lap around the lake in 6 minutes. It takes her younger sister, Jana, 8 minutes to finish one lap. If Hend and Jana continue to bike around the lake at the same rate, how many minutes will it take for them to come together at the starting point again?

Lap	1					
Hend	6					

Lap	1					
Jana	8					

Photo Credit: OlegD / Shutterstock.com

CONNECT

Math around Egypt: Mangroves

Work with your teacher to read the passage. Then, answer the question.

Mangrove trees grow in the Ras Abu Galum Protectorate and other areas of Egypt. Mangrove trees are important to our environment. The trees help filter out pollutants from water, protect coastlines, and act as breeding grounds for many different types of sea life.



Mangrove Roots

In one garden, Nada digs a hole to plant a mangrove seedling every 4 days. In a second garden, she plants a seedling every 6 days. If she plants seedlings in both gardens today, in how many days will she plant seeds again in both gardens on the same day?

Use the tables as needed.

Garden 1						
Day						

Garden 2						
Day						

Photo Credit: (a) OlegD / Shutterstock.com, (b) Sergey Kamshylin / Shutterstock.com

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 10

Factors or Multiples?

Quick Code
egm5052

Learning Targets

- I can explain the difference between factors and multiples.
- I can identify the greatest common factor and least common multiple of two given numbers.

ACCESS

Sinai Trail Work with your teacher to read the passage. Then, answer the questions.



Route to Sinai

Construction began on Sinai Trail in 2015. It is the first long distance hiking trail in Egypt. The original plan was a 220-kilometer route. The project's construction employed members of three Bedouin tribes. However, the Bedouin wanted the trail to encompass more of Sinai. So, after two more years of trail development, the trail was extended to a length of 550 km. The trail winds from the Gulf of Aqaba to the top of Mount Saint Catherine. The mountain is the highest in Egypt. Many Egyptians and visitors from around the world have hiked the trail.

Mohamed is training to hike Sinai Trail. For part of his training, he goes hiking every 7 days and lifts weights every 4 days. He did both types of exercise today. How many days from now will he both go hiking and lift weights?

Photo Credit: (a) OlegD / Shutterstock.com, (b) Richard Whitcombe / Shutterstock.com

BUILD

Factors and Multiples Discuss the questions with your Shoulder Partner and then solve.

What are two factors that 12 and 8 share? What are two multiples that they share? What do you notice? Find their LCM and GCF.

Greatest and Least Find the GCF and LCM for each number pair.

1. 12 and 10

GCF: _____ LCM: _____

2. 9 and 5

GCF: _____ LCM: _____

3. 11 and 2

GCF: _____ LCM: _____

4. 8 and 4

GCF: _____ LCM: _____

5. 9 and 12

GCF: _____ LCM: _____

GCF or LCM? Follow your teacher's directions to discuss and solve each problem.

1. Omnia has two strips of cloth. One is 35 centimeters wide, and the other is 75 cm wide. She wants to cut both pieces into strips of equal width that are as wide as possible. How wide should she cut the strips? Do you have to find the GCF or the LCM? What is the answer?

Photo Credit: OlegD / Shutterstock.com



2. Omar exercises every 12 days. Rana exercises every 8 days. Both friends exercised together today. How many days will it be until they exercise together again? Do you have to find the GCF or the LCM? What is the answer?

3. Menna is giving her friends pencils and special erasers. The store sells pencils in boxes of 8 and erasers in boxes of 10. If Menna wants the same number of each, what is the minimum number of pencils that she will have to buy? Do you have to find the GCF or the LCM? What is the answer?

4. Nour is making snack bags for an upcoming trip. He has 6 oranges and 12 pieces of dried fruit. He wants the snack bags to be identical without any food left over. What is the greatest number of snack bags Nour can make? Do you have to find the GCF or the LCM? What is the answer?

5. Malak baked 30 servings of cakes and 48 servings of baklava for her family. She wants to divide the desserts into containers so that each person receives the same number of servings. How many containers will she need? Do you have to find the GCF or the LCM? What is the answer?

6. Ola sells baskets of figs that each hold 9. She also sells bags of pomegranates that each hold 7. If she sells the same number of each, what is the smallest quantity of each type of fruit that she sold? Do you have to find the GCF or the LCM? What is the answer?

Photo Credit: OlegD / Shutterstock.com

CONNECT

Writing About Math Read and respond to the Essential Question: *How are all numbers related through factors and multiples?*



Top of a Mountain in Sinai

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Check Your Understanding

Follow your teacher's instructions to complete this activity.

UNIT

3

Theme 1 | Number Sense and Operations

Unit 3
Multiplication with Whole Numbers

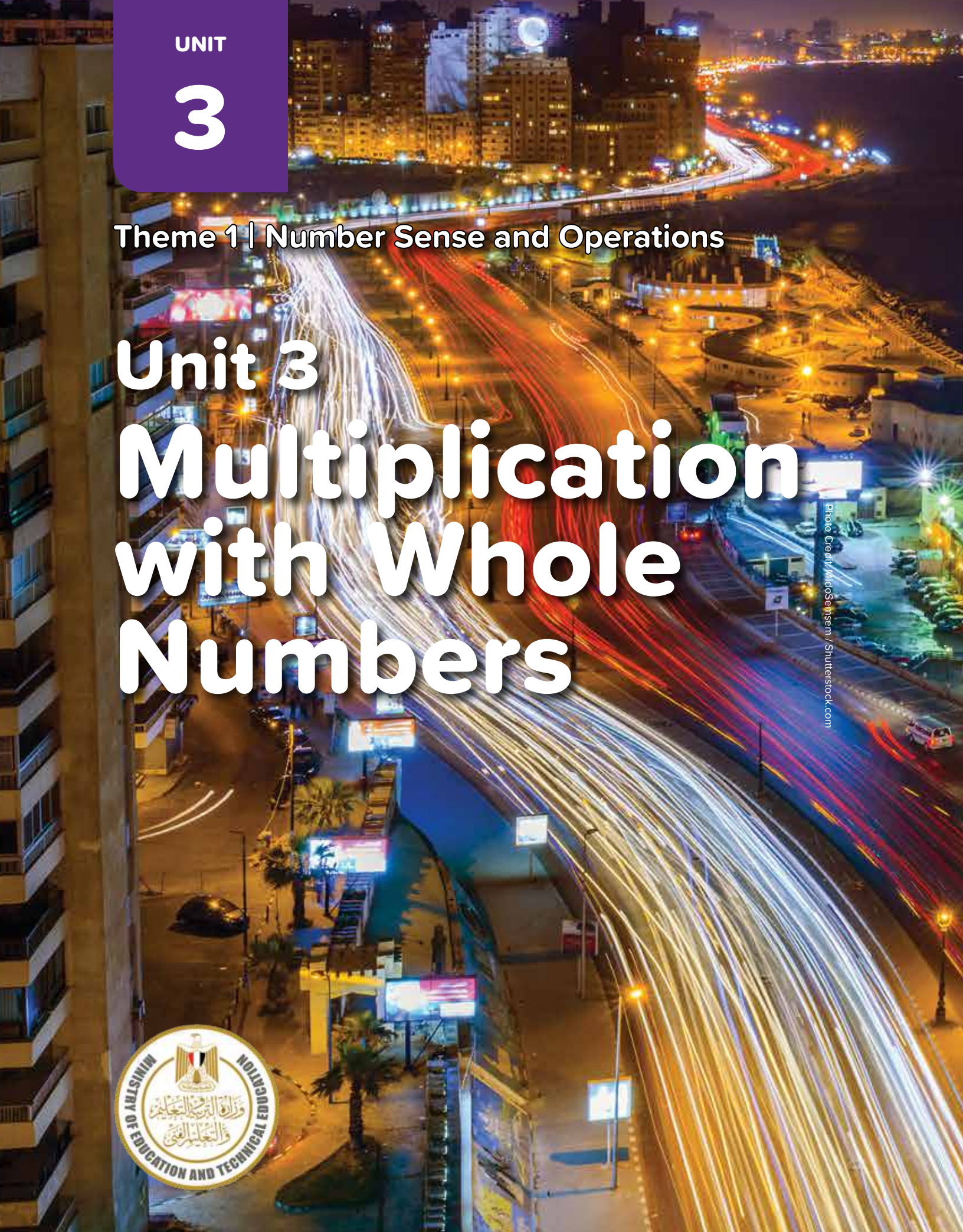


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MINISTRY OF EDUCATION AND TECHNICAL EDUCATION
وزارة التربية والتعليم والتعليم الفني



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Video

Multiplying Books

Unit Video Questions

The Unit 3 Opener Video, Multiplying Books, explores math around Egypt through multiplication. In this unit, you will use models to help build your understanding of multiplication. You will learn how to use place value to solve multiplication problems.

Quick Code
egm5055

- ☐ How did multiplication help the students make sense of the world around them?
- ☐ What did the students find out about multiplication and place value?

CONCEPT
1

Models for Multiplication

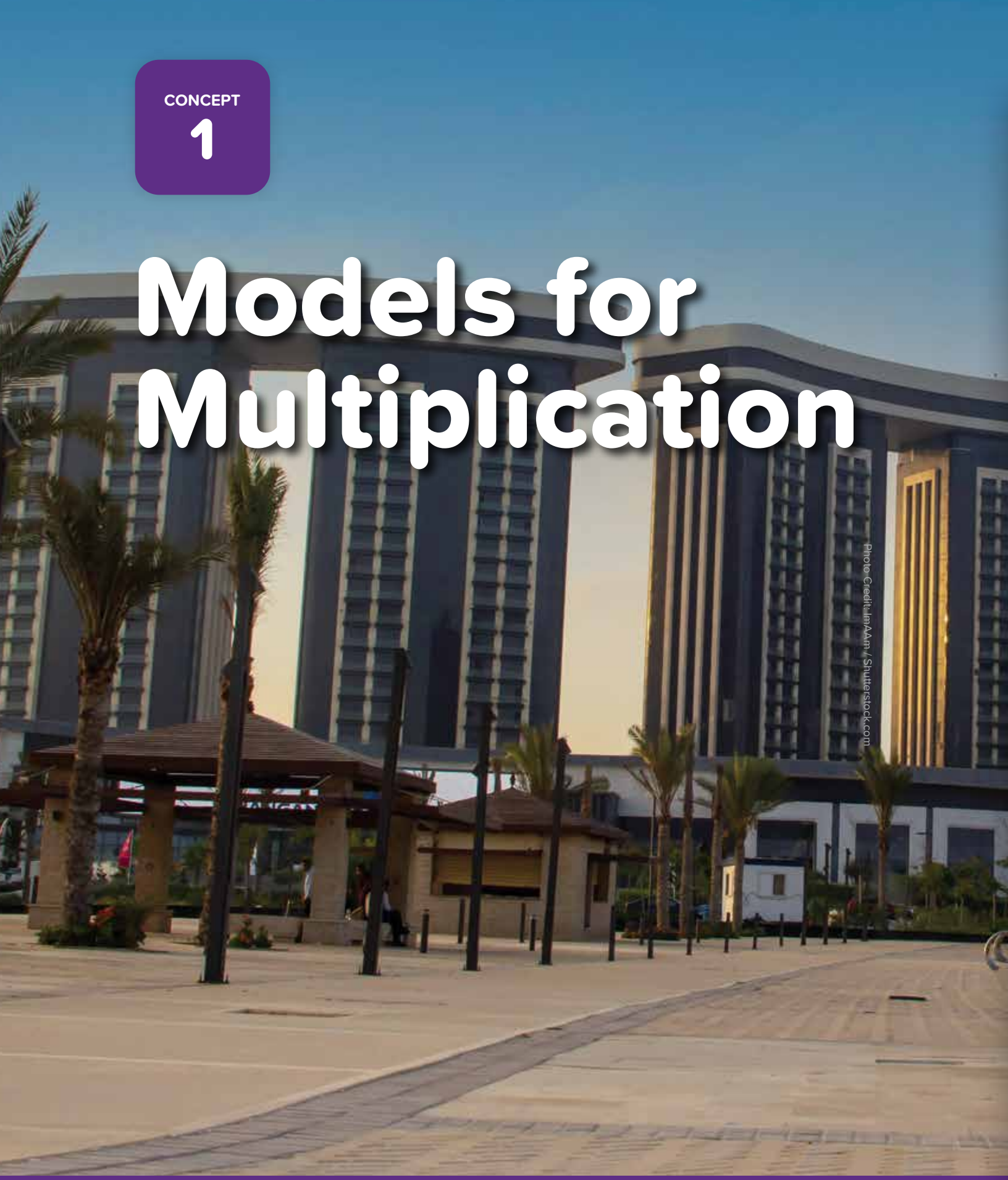


Photo Credit: ImAAm / Shutterstock.com

LESSON 1

The Power of Ten

Quick Code
egm5057

Learning Targets

- I can identify **powers of ten**.
- I can multiply single digits by powers of ten.
- I can explain the patterns I observe when multiplying by powers of ten.

ACCESS

Powers of Ten Patterns Look at the equations. Discuss with your partner any patterns you see.

$$10 \times 1 = 10$$
$$10 \times 10 = 100$$
$$10 \times 100 = 1{,}000$$
$$10 \times 1{,}000 = 10{,}000$$

Photo Credit: ImAAm / Shutterstock.com

BUILD

Jumping by Powers of Ten Solve.

1. $8 \times$ _____ $= 8{,}000$

2. $3 \times 10{,}000 =$ _____

3. _____ $\times 9 = 900$

4. $2 \times$ _____ $= 200{,}000$

5. $1{,}000 \times 6 =$ _____

Matching Expressions Choose from the given expressions to enter the one that is equal to the number.

5×100	10×5	$100,000 \times 5$	$5 \times 1,000$	$5 \times 10,000$

A. 50,000 _____

B. 500 _____

C. 5,000 _____

D. 50 _____

E. 500,000 _____

Multiplying by Powers of Ten Solve.

1. A crate of mangoes weighs 9 kilograms. How many kilograms would 1,000 crates weigh?

2. If 10 millimeters makes 1 centimeter, how many millimeters are in 7 centimeters?

Photo Credit: ImAAm / Shutterstock.com

3. There are 1,000 milliliters in 1 liter. Omar bought a 2-liter bottle of juice. How many milliliters are in the bottle?

4. Aya ran a 5-kilometer race on Saturday. If there are 1,000 meters in 1 kilometer, how many meters did she run?

CONNECT

Writing About Math Explain the difference between powers of ten and multiples of ten. Use examples to support your thinking.



Photo Credit: ImAAm / Shutterstock.com

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 2

Using the Area Model to Multiply

Quick Code
egm5059

Learning Target

- I can multiply using the **area model**.

ACCESS

Fast Fact Check-In Complete as many equations as possible in the time provided.

1. $5 \times 1{,}000 =$
2. $4 \times 10 =$
3. $1{,}000 \times 7 =$
4. $10{,}000 \times$ _____ $= 80{,}000$
5. $2 \times$ _____ $= 2{,}000$

Writing Expressions Write an expression to complete each equation using powers of ten for each given number.

1. $3{,}000 =$ _____ $\times$ _____
2. $800 =$ _____ $\times$ _____
3. $400{,}000 =$ _____ $\times$ _____
4. $70{,}000 =$ _____ $\times$ _____
5. $50 =$ _____ $\times$ _____

Multiplying Tens How many times will 10 need to be multiplied by itself to equal each given number?

1. 100
2. 1,000
3. 10,000
4. 100,000

Photo Credit: ImAAm / Shutterstock.com

BUILD

Expanding an Equation Look at the area model example.

Area Model Example: 234 × 27 = _____

	200	30	4
20	4,000	600	80
7	1,400	210	28

$$\begin{array}{r} {\scriptstyle 1\ \ 1\ \ \ \ \ \ } \\ 4{,}000 \\ 1{,}400 \\ 600 \\ 210 \\ 80 \\ +\ 28 \\ \hline 6{,}318 \end{array}$$

Whiteboard: Expanding Equations Work with your teacher and classmates to create area models and find each product.

1. 374 × 62 = _____

374 × 62

	70		
2		140	8

2. 506 × 42 = _____

506 × 42

3. Create your own area model for 732 × 16 = _____.

Using an Area Model Solve the problems using an area model.

1. 572 × 98 = _____

2. 201 × 32 = _____

3. 659 × 42 = _____

Photo Credit: ImAAm / Shutterstock.com

4. $3{,}352 \times 17 =$ _____

5. Ali walks 6 kilometers each day. If he walked 187 days a year, how many kilometers would he walk?

6. What if Ali were to drive 60 kilometers each day? How many kilometers would he drive in 187 days?

Decompose with Area Model Eman is planting a garden. She wants to find the area of the garden to know how much topsoil she will need. The garden is 46 meters long and 24 m wide. How many different ways can you decompose the numbers to help her find the area?

$46 \times 24 =$ _____

Example:

	20	20	6
20			
4			

Photo Credit: ImAAm / Shutterstock.com

Area Model Decomposed Solve the problems. Use an area model other than expanded form. Do not just break it down with place value.

1. $36 \times 62 =$ _____

2. $47 \times 19 =$ _____

3. $99 \times 51 =$ _____

4. $210 \times 79 =$ _____

5. $124 \times 87 =$ _____

CONNECT

Math around Egypt: Red Sea Hills Range Work with your teacher to read the passage. Then, answer the question.

Within the Eastern Desert is a mountain range that runs parallel to the Red Sea coast. Mountain heights in this range are between 1,700 and 2,000 meters.

Omar owns a travel company that takes visitors throughout the mountains of the Eastern Desert. He has 12 buses. Each bus can hold 25 passengers. How many passengers can Omar take each day if every bus is full?

Photo Credit: (a) ImAAm / Shutterstock.com, (b) Tamer Adel Soliman / Shutterstock.com



Eastern Desert

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 3

The Distributive Property of Multiplication

Quick Code
egm5061

Learning Target

- I can explain the relationship between the area model of multiplication and the **Distributive Property of Multiplication**.

ACCESS

Error Analysis Read the problem and complete the error analysis.

Badir thinks $206 \times 45 = 11{,}700$. Identify what Badir did correctly and incorrectly and then solve the problem.

	200	60	0
40	8,000	2,400	0
5	1,000	300	0

$$\begin{array}{r} 8{,}000 \\ 1{,}000 \\ 2{,}400 \\ +\ \ 300 \\ \hline 11{,}700 \end{array}$$

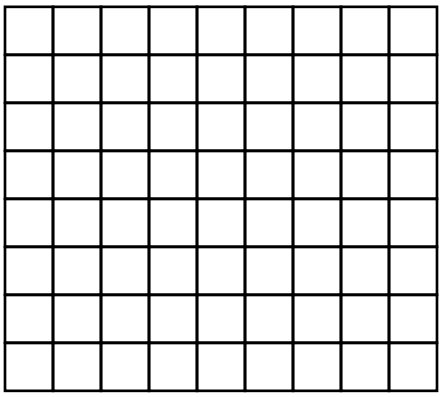
1. What did the student do correctly?
2. What did the student do incorrectly? Why do you think they made this error?
3. Try to solve the problem correctly. Explain your thinking.

BUILD

Distributing Numbers Read the information about the Distributive Property of Multiplication. Be prepared to share your thinking or questions. Then, write and solve equations to match the area models demonstrating the Distributive Property.

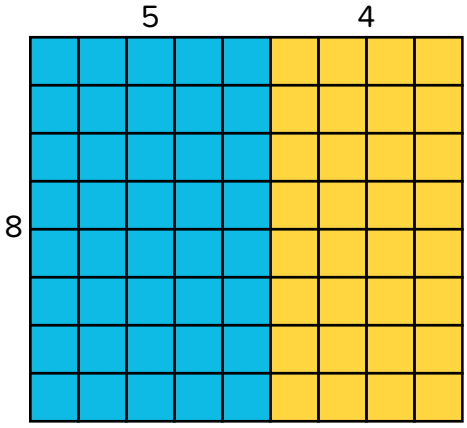
Photo Credit: ImAAm / Shutterstock.com

Model of the Distributive Property of Multiplication The product, 8×9, can be represented by a rectangle consisting of 8 rows of 9 square units.



This problem can also be broken into two smaller rectangles.

$$8 \times (5 + 4)$$



- The rectangles show $8 \times 5 = 40$ and $8 \times 4 = 32$. These numbers are then added to recompose the rectangle: $40 + 32 = 72$.
- 8×9 is therefore equivalent to $8 \times (5 + 4)$.
- $8 \times (5 + 4)$ is an example of the Distributive Property because we are distributing, or multiplying, both numbers in the parentheses (5 and 4) by the number 8.

Photo Credit: ImAAm / Shutterstock.com

The Distributive Property of Multiplication allows all numbers inside parentheses to be multiplied by the number outside the parentheses.

1. $58 \times 42 =$ _____

	50	8
40	2,000	320
2	100	16

$(40 \times$ _____ $) + (40 \times 8) + ($ _____ $\times 50) + (2 \times$ _____ $) =$ _____

2.

	30	7
20	600	140
4	120	28

$(20 \times 30) + ($ _____ $\times$ _____ $) + ($ _____ $\times$ _____ $) + (4 \times 7) =$ _____

3.

	60	3
20	1,200	60
9	540	27

4.

	40	7
30	1,200	210
9	360	63

Photo Credit: ImAAm / Shutterstock.com

5. Complete the area model and evaluate:

$(40 \times 40) + (40 \times 8) + (9 \times 40) + (9 \times 8) =$ _____.

	40	
	1,600	
9		72

Flexible Numbers Solve.

1. Mrs. Mona asked her class to find the product, 83×14. Here are three ways students thought about the problem. Record their work in an area model and evaluate. Remember the addends on each side must equal 83 and 14, respectively.

Mazen: $(40 \times 10) + (40 \times 10) + (40 \times 4) + (40 \times 4) + (3 \times 10) + (3 \times 4)$

	40	40	3
10			
4			

Lamiaa: $(80 \times 7) + (80 \times 7) + (3 \times 7) + (3 \times 7)$

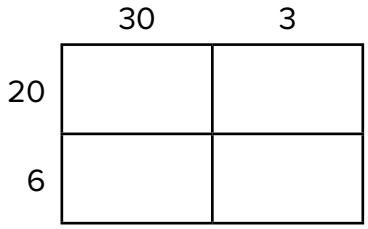
	80	3
7		
7		

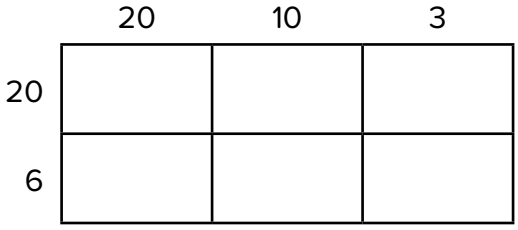
Reeda: $(80 \times 10) + (80 \times 4) + (3 \times 10) + (3 \times 4)$

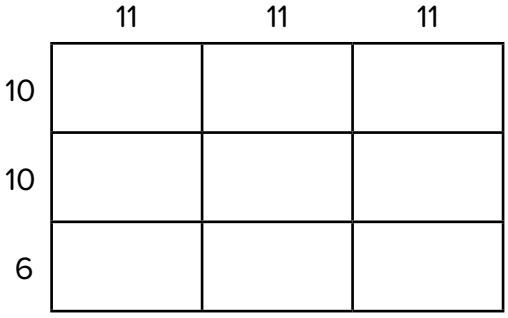
	80	3
10		
4		

Photo Credit: ImAAm / Shutterstock.com

2. Mrs. Mona then asked her class to evaluate 33×26. Here are three ways students thought about the problem using an area model. Write an expression for each model. Then, choose one of the area models to evaluate the expression.







3. Mrs. Mona would like you to solve a problem. Create an area model and evaluate: $42 \times 34 =$ _____.

Photo Credit: ImAAm / Shutterstock.com

CONNECT

Math around Egypt: The Fennec Fox Work with your teacher to read the passage. Then, use a model to solve the problem.

The mountains of the Eastern Desert are excellent desert habitats for small mammals like the fennec fox. These foxes are small and have adapted to the harsh desert environment by having large ears to help cool them down.

When a fennec fox builds a den, it can have up to 15 different entrances. How many entrances could 32 dens have?



Fennec Fox

Photo Credit: (a) ImAAm / Shutterstock.com, (b) atiger / Shutterstock.com

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 4

Using the Partial Products Model to Multiply

Quick Code
egm5063

Learning Targets

- I can multiply using the **partial products** model.
- I can estimate products.

ACCESS

Estimating Products Estimate the product for each problem. Then, discuss your estimation strategies with a partner. Be prepared to share your thinking with the class.

1. 34×58
2. 192×75
3. 356×19
4. $8{,}976 \times 8$

BUILD

Partial Products Work with your teacher and classmates to solve the following using the partial products strategy.

1.
$$\begin{array}{r} 97 \\ \times\ 68 \\ \hline \end{array}$$

$(60 \times 90) =$ _____

$(60 \times 7) =$ _____

$(8 \times 90) =$ _____

$(8 \times 7) =$ _____

2.
$$\begin{array}{r} 356 \\ \times\ 43 \\ \hline \end{array}$$

$(3 \times 6) =$ _____

$(3 \times 50) =$ _____

$(3 \times 300) =$ _____

$(40 \times 6) =$ _____

$(40 \times 50) =$ _____

$(40 \times 300) =$ _____

Photo Credit: ImAAm / Shutterstock.com



Partial Products Game

Follow the directions to play the Partial Products Game with a partner. Record each estimate and problem in the grid.

Directions

- Each player picks four or five cards depending on the teacher's direction.
- Each player creates two 2-digit numbers *or* one 3-digit number and one 2-digit number and records the numbers.
- Players estimate the product and record their own estimate.
- Players solve their own problems using the partial products strategy.
- The player closest to their estimate gets one point.

Estimation	Problem and Work	SCORE 1 point for person closest to estimate
Example: 45×82 $40 \times 80 = 3{,}200$	45 $\times\ 82$ $(80 \times 40) = 3{,}200$ $(80 \times 5) = 400$ $(2 \times 40) = 80$ $(2 \times 5) = 10$ $3{,}690$	1

Photo Credit: InAAm / Shutterstock.com

CONNECT

Math around Egypt: Red Sea Riviera Work with your teacher to read the passage. Then, answer the question.

The Red Sea Riviera is Egypt's eastern coastline along the Red Sea. It includes resort cities along the Gulf of Suez.

There are 18 hotels in a resort city. If each hotel has 135 guests, how many guests are staying in the city? Use the partial products strategy to solve.



Beach Resort

Photo Credit: (a) ImAAm / Shutterstock.com, (b) Kokhanchikov / Shutterstock.com

Check Your Understanding

Follow your teacher's instructions to complete this activity.



Photo Credit: ImAAm / Shutterstock.com

CONCEPT
2

Multiplying 4-Digit Numbers by 2-Digit Numbers

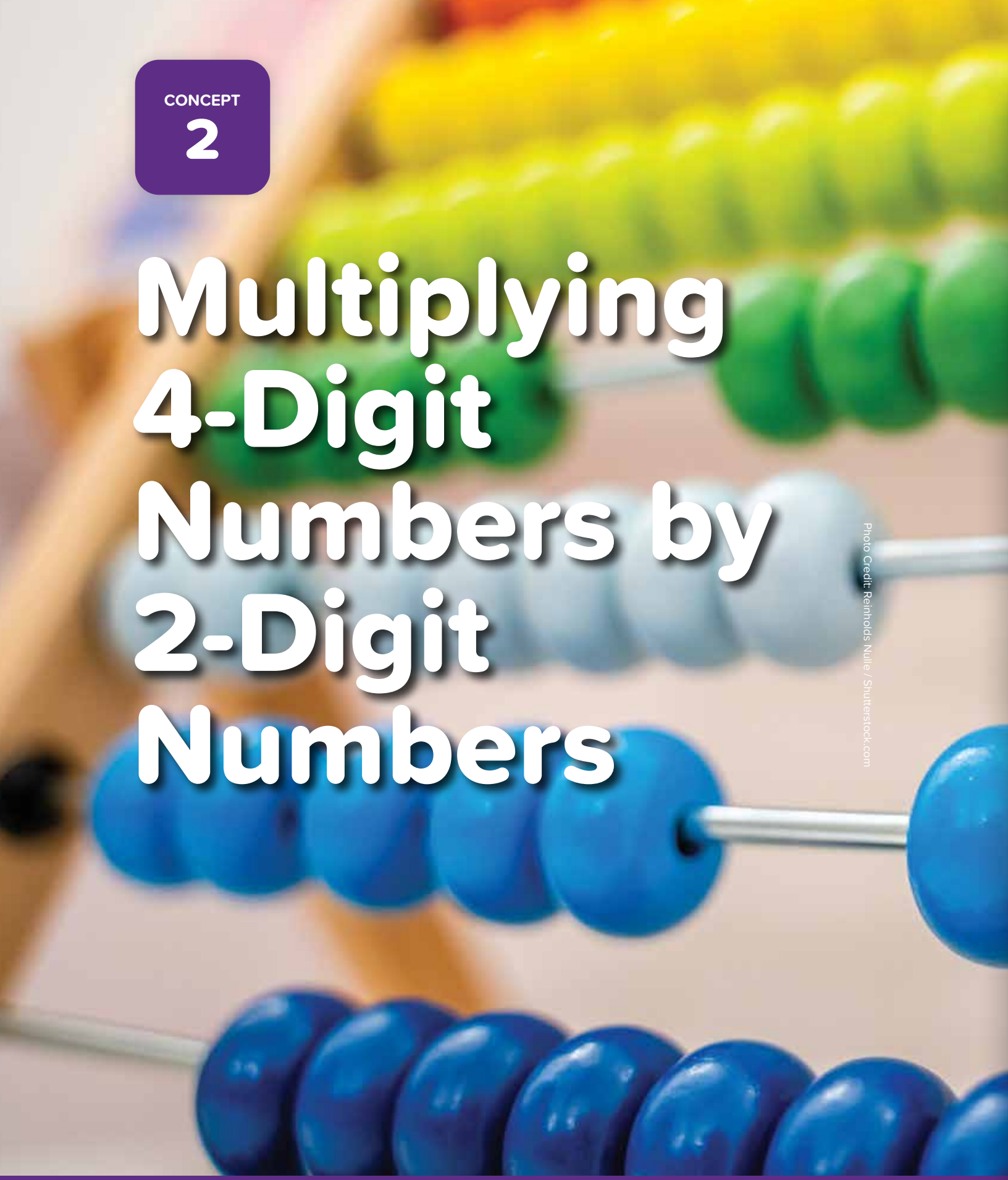


Photo Credit: Reinhold Nulle / Shutterstock.com

LESSON 5

What Is an Algorithm?

Quick Code
egm5066

Learning Target

- I can multiply using the standard **algorithm**.

ACCESS

Mental Math Follow your teacher's directions to complete the learning activity.

1. Solve the problems mentally. You may record the products.

35×10 25×100 $75 \times 1{,}000$

2. Use the products from Problem 1 to find these products. You may record your results.

35×9 25×99

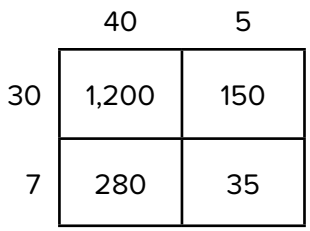
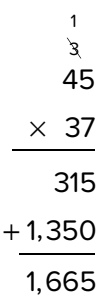
3. How did the products from Problem 1 help you find the products in Problem 2?

BUILD

Comparing Multiplication Models Look at the three strategies and discuss the questions with a Shoulder Partner:

- How are the strategies similar?
- How are the strategies different?
- Which strategy seems most efficient to you?

Photo Credit: Reinholds Nulle / Shutterstock.com

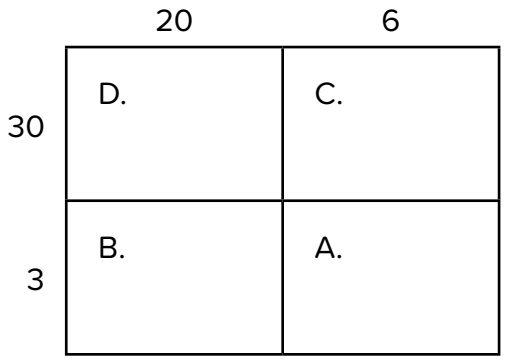
Area Model	Partial Products Model	Standard Algorithm for Multiplication
	45×37 $(30 \times 40) = 1{,}200$ $(30 \times 5) = 150$ $(7 \times 40) = 280$ $(7 \times 5) = 35$ $1{,}665$	

How does the standard algorithm work?

- Work from bottom to top.
- Work from right to left.
- Start with the Ones place.
- Remember place value as you multiply.
- Line up the products by place value before you add them together.

Standard Multiplication Algorithm

1. Fill in the area model starting at letter A.



E. Final product: _____

Photo Credit: Reinholds Nulle / Shutterstock.com

2. Record the partial products in the order listed.

$$\begin{array}{r} 26 \\ \times\ 33 \\ \hline \end{array}$$

$(3 \times 6) =$ _____

$(3 \times 20) =$ _____

$(30 \times 6) =$ _____

$(30 \times 20) =$ _____

Final product: _____



Beach Resort after Rain

Photo Credit: (a) Reinhold Nulle / Shutterstock.com, (b) julius fekete / Shutterstock.com

3. Fill in the area model. Then, explain which parts of the area model and the standard algorithm match.

	70	6
20		
4		

$$\begin{array}{r} {\scriptstyle 1}\,{\scriptstyle 2} \\ 76 \\ \times\ 24 \\ \hline 304 \\ +1{,}520 \\ \hline 1{,}824 \end{array}$$

4. Determine the values of the missing digits and then find the final product.

$$\begin{array}{r} {\scriptstyle 4}\,{\scriptstyle 4} \\ 67 \\ \times\ 76 \\ \hline 402 \\ +\boxed{a}69\boxed{b} \\ \hline \boxed{c} \end{array}$$

5. $76 \times 82 =$ _____

6. $234 \times 53 =$ _____

7. Akram says that 34×69 will give you the same product as $(34 \times 70) - 34$. Do you agree or disagree? Why?

Photo Credit: Reinhold Nulle / Shutterstock.com

CONNECT

Math around Egypt: Climate in the Eastern Desert Work with your teacher to read the passage and answer the question.

The Eastern Desert usually receives less than 25 millimeters of rain per year. The mountains can cause a rain shadow. This occurs when the moist air from the Red Sea rises and gets trapped on the eastern side of the mountains, not allowing the rain to reach the desert side of the mountains.

Effect of a Rain Shadow

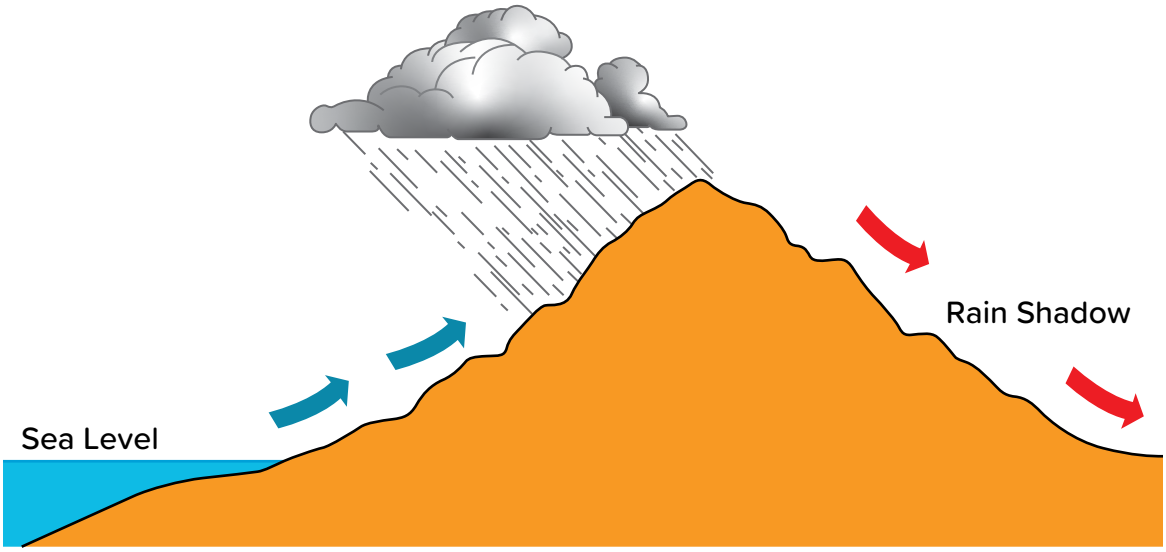


Photo Credit: Reinholds Nulle / Shutterstock.com

If you wanted to calculate the highest possible amount of rain in the Eastern Desert over a 25-year time span, how would you solve the problem? Use words and numbers to explain your thinking.

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 6

Multiplying Multi-Digit Numbers

Quick Code
egm5068

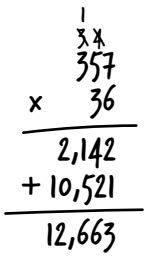
Learning Targets

- I can multiply 4-digit numbers by 2-digit numbers using the standard algorithm.
- I can use estimation to check the reasonableness of my answers.

ACCESS

Error Analysis Read the problem and complete the error analysis.

Ashraf evaluated 357 × 36 using the standard algorithm. Analyze Ashraf's work. Identify what Ashraf did correctly and incorrectly, and then solve the problem.



1. What did Ashraf do correctly?
2. What did Ashraf do incorrectly?
3. Try to solve the problem correctly. Explain your thinking.

BUILD

More Digits, More Fun Follow your teacher's directions to complete the learning activity.

Photo Credit: Reinholds Nulle / Shutterstock.com

Match the Model Solve each problem. First, estimate and record your estimate. Then, solve using the multiplication algorithm. Finally, record the letter of the matching model.

Match the Model

A.

	3,000	500	60	7
20	60,000	10,000	1,200	140
4	12,000	2,000	240	28

D.

	8,000	200	20	2
50	400,000	10,000	1,000	100
3	24,000	600	60	6

B.

$$\begin{array}{r} 6,209 \\ \times\ 33 \\ \hline 27 \\ 60 \\ 18,000 \\ 270 \\ 600 \\ +180,000 \end{array}$$

E.

	8,000	200	20	2
5	400,000	1,000	100	10
4	24,000	600	60	6

C.

$$\begin{array}{r} 6,209 \\ \times\ 33 \\ \hline 27 \\ 600 \\ 18,000 \\ 270 \\ 6,000 \\ +180,000 \end{array}$$

F.

	2,000	500	20	1
70	140,000	35,000	1,400	70
4	8,000	2,000	80	4

Photo Credit: Reinholds Nulle / Shutterstock.com

1. $3{,}567 \times 24$

My Estimate: _____

Evaluate: $3{,}567 \times 24 =$ _____

Matching Model Letter: _____

2. $2{,}521 \times 74$

My Estimate: _____

Solve: $2{,}521 \times 74 =$ _____

Matching Model Letter: _____

3. $8{,}222 \times 53$

My Estimate: _____

Evaluate: $8{,}222 \times 53 =$ _____

Matching Model Letter: _____

4. $6{,}209 \times 33$

My Estimate: _____

Evaluate: $6{,}209 \times 33 =$ _____

Matching Model Letter: _____

CONNECT

Writing About Math Respond to the prompt.



Thunderstorm

When multiplying multi-digit numbers, what is your preferred strategy? Explain your reasoning. You may use words and numbers to express your ideas.

Photo Credit: (a) Reinholds Nulle / Shutterstock.com, (b) Ossamaabdelbary / Shutterstock.com

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 7

Multiplication Problems in the Real World

Quick Code
egm5070

Learning Target

- I can solve multistep story problems involving multiplication.

ACCESS

Math around Egypt: Sandstorms Work with your teacher to read the passage. Then, solve the problems.

Sandstorms are caused by thunderstorms or strong air pressure. The storms can last minutes or hours. The sand and dust are transported thousands of kilometers away with winds up to 140 kilometers per hour.

If a sandstorm lasts for 120 minutes each day for 33 days in a row, how many minutes did it storm all together?

Challenge How many hours did the sandstorm last?

Photo Credit: Reinholds Nulle / Shutterstock.com

BUILD

Mona's Restaurant Follow your teacher's directions to complete the learning activity.

A major trade route took traders from Qift along the Nile to Al-Quesyr on the coast of the Red Sea, through the Eastern Desert. From the Red Sea, this important trade route connected to the Silk Road in Asia. The coastal town of Al-Quesyr continues to be an important tourist destination to this day.



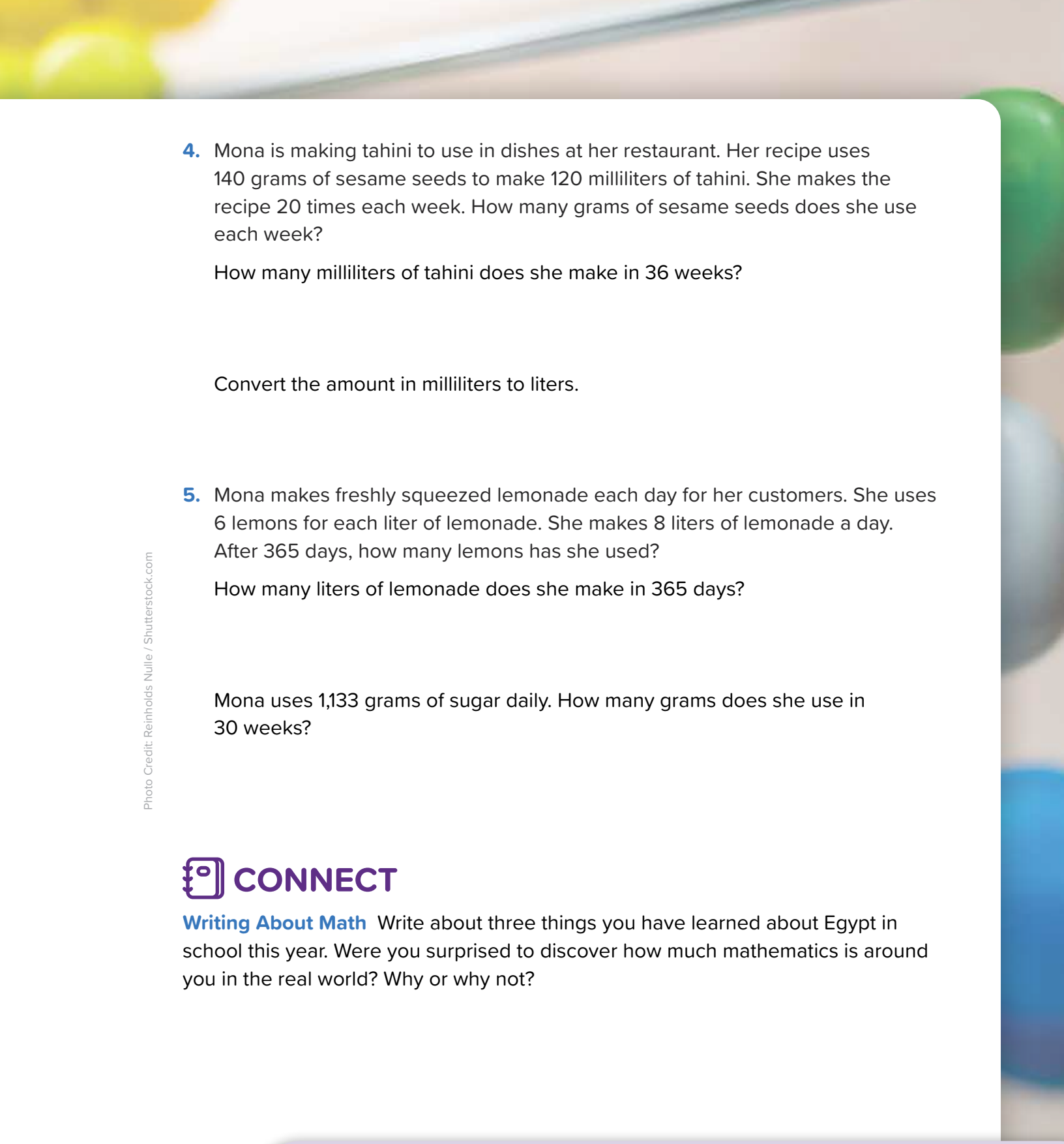
Grilling Chicken

Photo Credit: (a) Reinholds Nulle / Shutterstock.com, (b) DmytroKorolov / Shutterstock.com

1. Mona has a restaurant in Al-Quesyr. In February, Mona sold 402 kebabs. In March, she sold 753 kebabs. She makes each kebab with 83 grams of meat. How many grams of meat did she use in February and March?

2. Mona's son Wael makes baklava to sell at his family's restaurant. His recipe calls for 170 grams each of pistachios, walnuts, and hazelnuts. In order to make enough for the customers, he needs to multiply his recipe by 18. How many total grams of nuts will he need?

3. For Wael's baklava syrup, he needs 250 milliliters of honey, 15 mL of orange extract, and 30 mL of lemon juice per recipe. How many total milliliters of liquid ingredients will he need for the sauce if he needs to make 18 batches?



4. Mona is making tahini to use in dishes at her restaurant. Her recipe uses 140 grams of sesame seeds to make 120 milliliters of tahini. She makes the recipe 20 times each week. How many grams of sesame seeds does she use each week?

 How many milliliters of tahini does she make in 36 weeks?

 Convert the amount in milliliters to liters.

5. Mona makes freshly squeezed lemonade each day for her customers. She uses 6 lemons for each liter of lemonade. She makes 8 liters of lemonade a day. After 365 days, how many lemons has she used?

 How many liters of lemonade does she make in 365 days?

 Mona uses 1,133 grams of sugar daily. How many grams does she use in 30 weeks?

Photo Credit: Reinholds Nulle / Shutterstock.com

CONNECT

Writing About Math Write about three things you have learned about Egypt in school this year. Were you surprised to discover how much mathematics is around you in the real world? Why or why not?

Check Your Understanding

Follow your teacher's instructions to complete this activity.

UNIT

4

Theme 2 | Mathematical Operations and Algebraic Thinking

Unit 4 Division with Whole Numbers

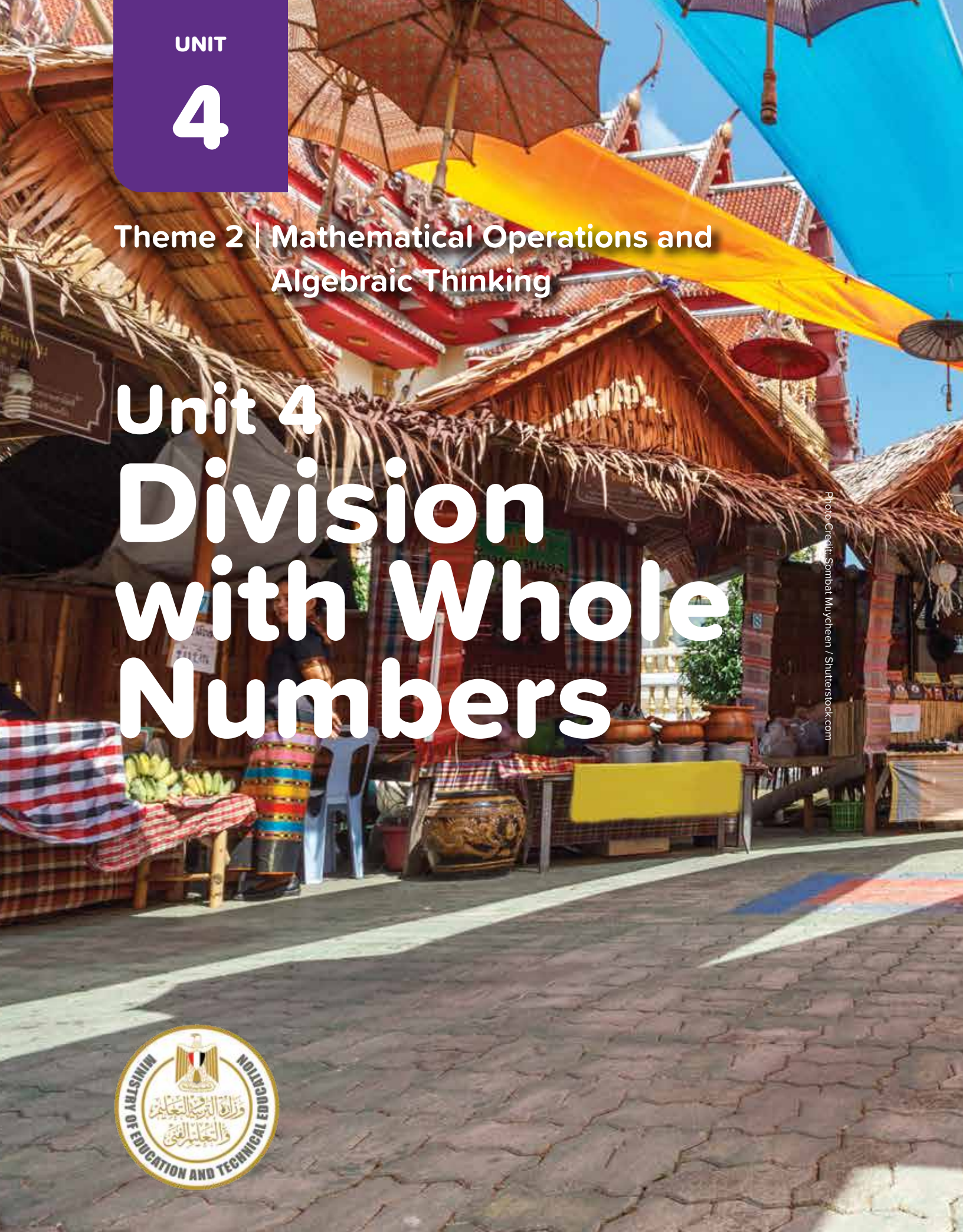


Photo Credit: Sombat Muycheen / Shutterstock.com

MINISTRY OF EDUCATION AND TECHNICAL EDUCATION



Mastering Division

Unit Video Questions

The Unit 4 Opener Video, Mastering Division, explores math around Egypt through division. In this unit, you will investigate the meaning of division and learn strategies for solving division problems. You will explore its relationship to multiplication and utilize your problem-solving skills.

Quick Code
egm5073

- [] How did the students use division to make sense of the world around them?
- [] What did the students find out about using patterns to solve division problems?

Photo Credit: (a) Sombat Muycheen / Shutterstock.com; (b) Oleksandr Kalinenko / Shutterstock.com

CONCEPT
1

Models for Division

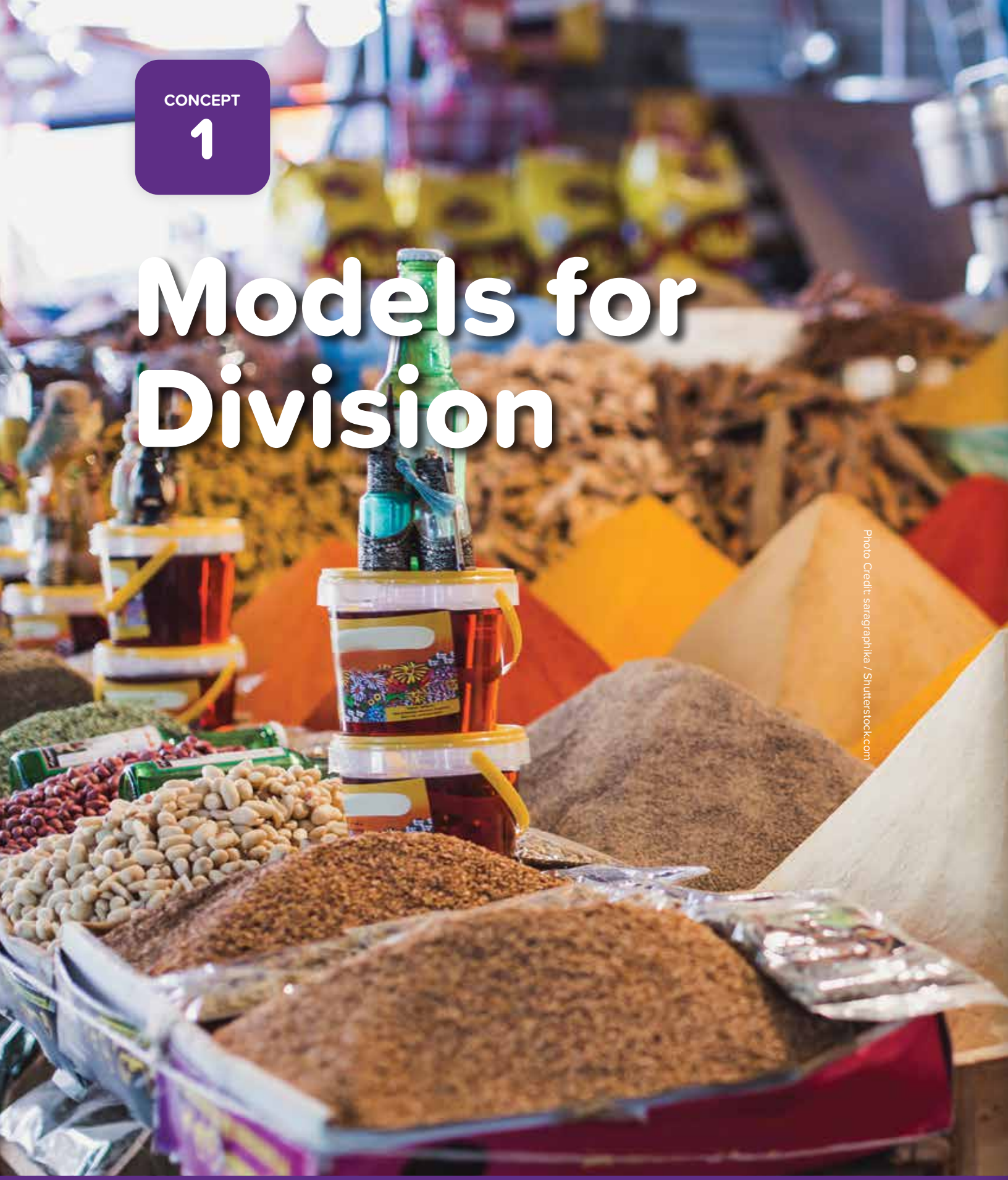


Photo Credit: saragraphika / Shutterstock.com

LESSON 1

Understanding Division

Quick Code egm5075

Learning Target

- I can use story problems to explain the meaning of division problems.

ACCESS

Write and Solve Choose three of the numbers given and use them to create a division equation. Use words, drawings, diagrams, or numbers to prove your division equation is true.

100	25	7	4	5
35	20	14	28	2

BUILD

Defining Division Read each problem. Write an equation and label the dividend, divisor, quotient, and remainder. Then, draw a model of each problem.



Fruit Vendor

1. If 18 plums are divided equally into 3 bags, then how many plums will be in each bag?

2. If 18 plums are packed 3 to a bag, then how many bags will there be?

3. A red hat costs 400 LE, which is 4 times as much as a blue hat costs. How much does a blue hat cost?

Photo Credit: (a) saragraphika / Shutterstock.com, (b) Aleks333 / Shutterstock.com

4. A red hat costs 400 LE and a blue hat costs 100 LE. How many times greater is the cost of the red hat?

HANDS-ON ACTIVITY

Representing Division

Play the game with your partner. If asked, share your answers and thinking with the class.

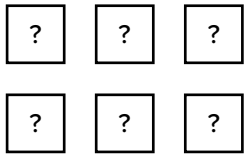
- Choose one of your Representing Division cards. Read the problem, and draw a model.
- Trade your model with your partner.
- On your partner's card, write the division sentence. Circle Number of Groups or the Number in Each Group to show what the divisor represents.
- Repeat until all cards are finished.

CONNECT

Writing About Math Read the division problem and circle which model you think best matches the scenario. Explain your thinking.

There are 327 job applicants for a new business. They will need to place the people in 6 rooms while they fill out applications. How many people will be in each room?

A **Total = 327**



B **Total = 327**

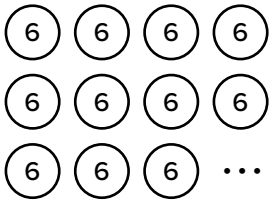


Photo Credit: saragraphika / Shutterstock.com

Check Your Understanding

Follow your teacher's instructions to complete this activity.



LESSON 2

Using the Area Model to Divide

Quick Code
egm5077

Learning Target

- I can use the **area model** to solve division problems.

ACCESS

Patterns in Multiplication Complete each set of multiplication equations, and explain any patterns you noticed.

1. $3 \times 5 =$ _____

$3 \times 50 =$ _____

$3 \times 500 =$ _____

2. $4 \times 10 =$ _____

$4 \times 100 =$ _____

$4 \times 1{,}000 =$ _____

3. $15 \times 2 =$ _____

$15 \times 20 =$ _____

$15 \times 200 =$ _____

4. $40 \times 2 =$ _____

$40 \times 20 =$ _____

$400 \times 200 =$ _____

5. $12 \times 3 =$ _____

$12 \times 30 =$ _____

$12 \times 300 =$ _____

6. $8 \times 2 =$ _____

$8 \times 20 =$ _____

$8 \times 200 =$ _____

Photo Credit: saragraphika / Shutterstock.com

BUILD

Whiteboard: Using the Area Model Work with your teacher to use the area model strategy to solve the division equations.

1. 2,207 ÷ 7 = _____



2. 1,625 ÷ 13 = _____



Model Match Choose the correct area model that represents each problem and fill in any missing numbers. Then, use the area model to answer each problem.

1. 9,234 ÷ 81 = _____

2. 3,622 ÷ 31 = _____

3. 1,050 ÷ 7 = _____

4. 2,623 ÷ 43 = _____

5. 5,382 ÷ 52 = _____

A.

31	100	10	6
	3,622 − 3,100 522	522 − 310 212	212 − 186 26

100 + 10 + 6 = 116 R26

Photo Credit: saragraphika / Shutterstock.com



B.

	100	50
_____	1,050 − 700 350	350 − 350 0

100 + 50 = 150

C.

	_____	_____	_____	_____
81	9,234 − 8,100 1,134	1,134 − 810 324	324 − 162 162	162 − 162 0

_____ + _____ + _____ + _____ = _____

D.

	100	2	1
52			

100 + 2 + 1 = 103 R26

E.

	50	10	1
43	2,623 − 2,150 473	473 − 430 43	43 − 43 0

_____ + _____ + _____ = _____

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CONNECT

Writing About Math: Error Analysis Look at the problem, and analyze the student's area model. Identify what the student did incorrectly.

Divide: 2,852 ÷ 24 = _____

Student's area model:

24)2,852

	10	5	100	3
24	2,852 − 240 2,612	2,612 − 120 2,492	2,492 − 2,400 92	92 − 72 (20)

2,852 ÷ 24 = 20

Photo Credit: saragraphika / Shutterstock.com

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 3

Using the Partial Quotients Model to Divide

Quick Code
egm5079

Learning Target

- I can use the **partial quotients model** to solve division problems.

ACCESS

Numberless Story Problem Work with your teacher to build understanding of each problem. As your teacher reveals more information, record your responses.

The factory made _____ shirts. It sorted the shirts into _____ equal groups.

Solve using an area model.



Shirts

BUILD

Modeling Partial Quotients Use the partial quotients strategy to solve the problems.

1. 1,536 ÷ 16 = _____

2. 576 ÷ 18 = _____

Photo Credit: (a) saragraphika / Shutterstock.com, (b) Emily Marie Wilson / Shutterstock.com

Fill in the Blank Look at the partial quotients solution for each problem. Fill in the blanks and empty boxes to complete the solution.

1.

```
      118 R13
23)2,727
 – 2,300 | ____
     427
   – 230 | ____
     197
    – 69 | ____
     128
    – 69 | ____
      59
    – 46 | ____
      13
```

2.

```
      134 R23
60)8,063
 –  [   ] | 100
   2,063
 –  [   ] | 30
     263
 –  [   ] | 4
      23
```

3.

```
    [   ]
3)2,451
 –  [   ] | 800
      51
    – 30 | ____
      21
 –  [   ] | ____
       0
```

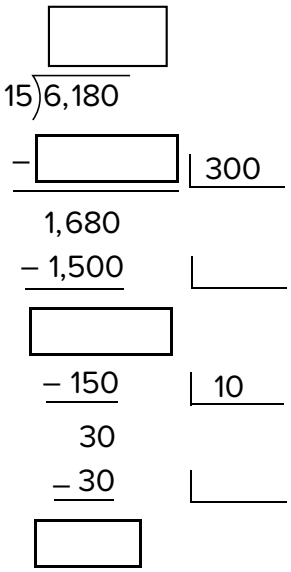
4.

```
    [   ]
9)4,608
 – 4,500 | ____
  [   ]
    – 90 | ____
      18
   – 18 | ____
       0
```

Photo Credit: saragraphika / Shutterstock.com



5.



6.

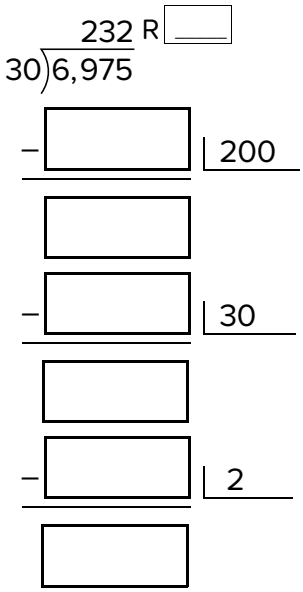


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CONNECT

Writing About Math How can finding parts of a quotient make it easier to solve division problems?

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 4

Estimating Quotients

Quick Code
egm5081

Learning Target

- I can use estimation to check the reasonableness of my answers.

ACCESS

Mental Math Use mental math to divide.

1. 5,600 ÷ 70 = _____

2. 140 ÷ 20 = _____

3. 8,100 ÷ 90 = _____

4. 2,400 ÷ 80 = _____

5. 3,600 ÷ 9 = _____

BUILD

Compatible Numbers Estimate using compatible numbers. Then, solve using an area model or the partial quotients model.

5,814 ÷ 47 = _____

My Estimate: _____

My Solution: _____

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Winner Takes All

Play the game in groups of two to practice estimating quotients.

Object: Collect all the cards.

1. Each player shuffles a deck of 12 cards and places the cards face down.
2. Each player places the top card in the center space at the same time, revealing each division problem.
3. Each player estimates the **quotient** using **compatible numbers** and then shares their **estimate** with the other player. Players should check each other's work.
4. The player with the greater estimated quotient takes both cards and adds them to the bottom of his or her own pile.
5. If there is a tie, both players turn over the next card on their piles and repeat the process. The winner of that round takes all four cards.
6. Play continues until one player has all the cards.

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CONNECT

Writing About Math Since Primary 2, you have been practicing rounding, estimating, using benchmark numbers, and compatible numbers. How have you used these strategies to improve your skills as a mathematician?

Check Your Understanding

Follow your teacher's instructions to complete this activity.

CONCEPT
2

Dividing by 2-Digit Divisors

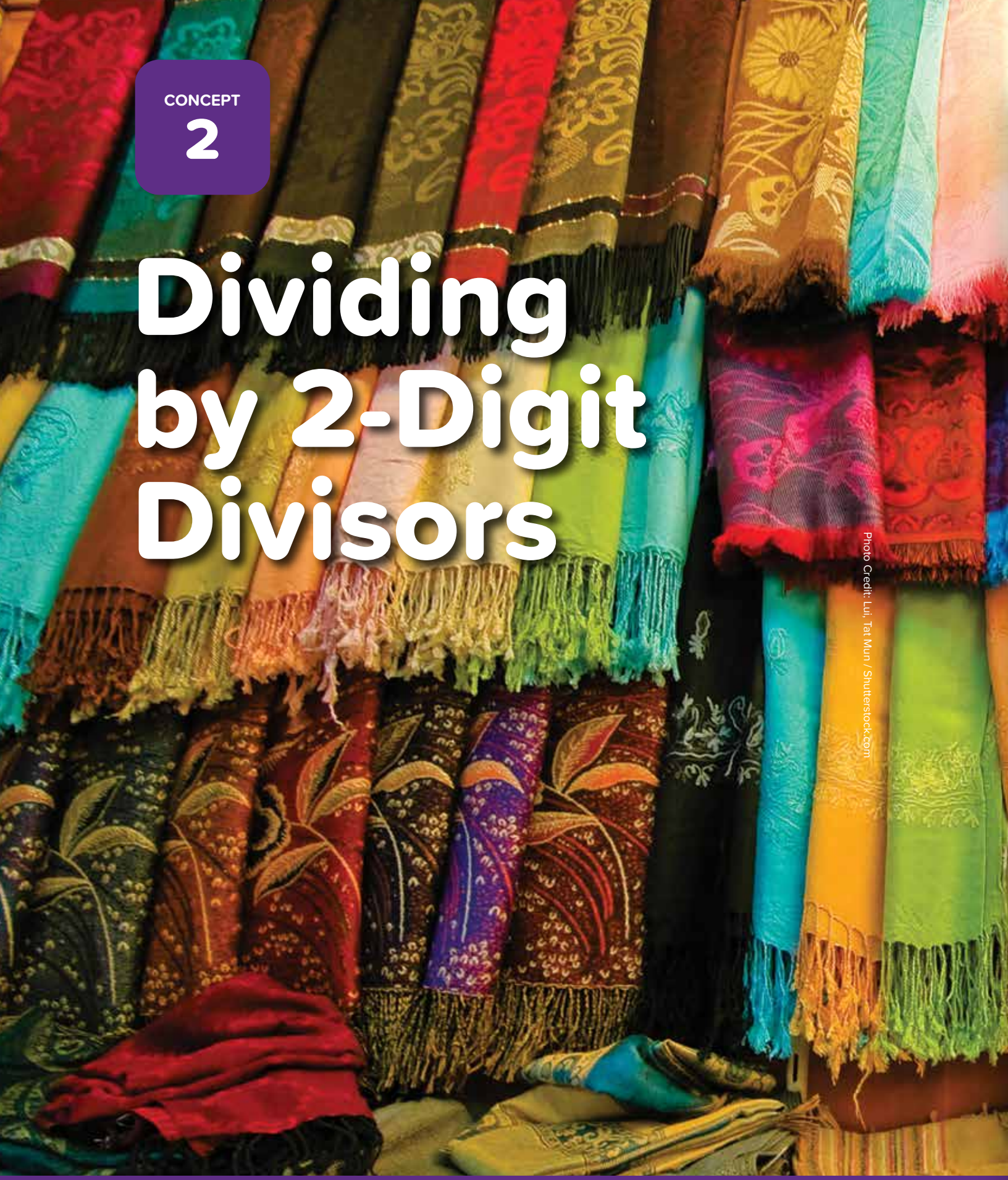


Photo Credit: Lui, Tat Mun / Shutterstock.com

LESSON 5

Using the Standard Algorithm to Divide

Quick Code
egm5084

Learning Target

- I can use the standard algorithm to divide by a 2-digit **divisor**.

ACCESS

Dividing Beans Read the problem. Work with your teacher to solve the problem. Then, copy the problem and solution into your Math Notebook.

Rana owns a coffee shop. She uses 1 full scoop of coffee beans to brew one cup of coffee. Her container has _____ beans. She knows her scoop holds _____ beans. Rana wants to know how many cups of coffee she can make from this container of beans. How could Rana find out how many scoops are in this container?



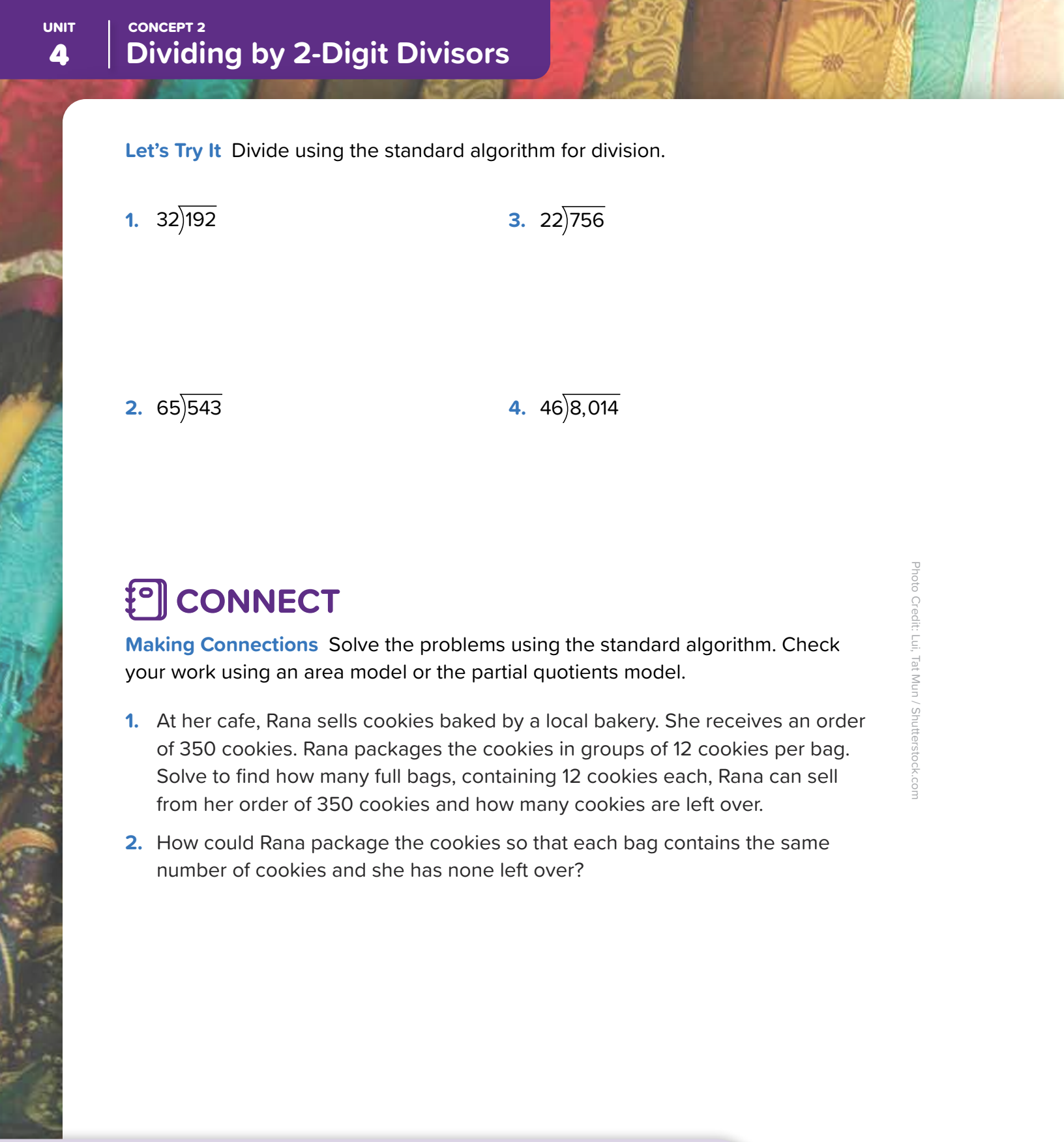
Coffee Beans

Photo Credit: (a) Lui, Tat Mun / Shutterstock.com, (b) Shutterstock.com

BUILD

Find the Similarities Copy your teacher's solution into your Math Notebook. Discuss how the standard algorithm for division is similar to and different from the area model and partial quotients model.

$$43\overline{)1{,}376}$$



Let's Try It Divide using the standard algorithm for division.

1. $32\overline{)192}$

2. $65\overline{)543}$

3. $22\overline{)756}$

4. $46\overline{)8,014}$

CONNECT

Making Connections Solve the problems using the standard algorithm. Check your work using an area model or the partial quotients model.

1. At her cafe, Rana sells cookies baked by a local bakery. She receives an order of 350 cookies. Rana packages the cookies in groups of 12 cookies per bag. Solve to find how many full bags, containing 12 cookies each, Rana can sell from her order of 350 cookies and how many cookies are left over.
2. How could Rana package the cookies so that each bag contains the same number of cookies and she has none left over?

Photo Credit: Lui, Tat Mun / Shutterstock.com

Check Your Understanding

Follow your teacher's instructions to complete this activity.



LESSON 6

Checking Division with Multiplication

Quick Code
egm5086

Learning Targets

- I can use the standard algorithm to divide by a 2-digit divisor.
- I can use multiplication to check answers to division problems.

ACCESS

Error Analysis Ayman says that 8,858 ÷ 43 = 26. Analyze Ayman's work. Do you agree or disagree with his solution? Explain your thinking.

$$
\begin{array}{r}
26 \\
43\overline{)8{,}858} \\
-\,86 \\
\hline
258 \\
-\,258 \\
\hline
0
\end{array}
$$

BUILD

HANDS-ON ACTIVITY

Keep the Leftovers

Play the game with your partner to practice checking division answers using multiplication.

1. Decide who goes first.
2. Player 1 starts with 200 and chooses a divisor from the list. Players cross out the divisor so it cannot be used again.
3. Player 1 solves the division problem and announces the solution. Example: 200 ÷ 17 = 11 R13.
4. Player 2 uses multiplication and addition to check. Example: 17 × 11 = 187; 187 + 13 = 200.

Photo Credit: Lui, Tat Mun / Shutterstock.com



HANDS-ON ACTIVITY

Keep the Leftovers

5. When you and your partner agree on the solution, write the equation on the record sheet. Circle the **remainder** and write Player 1's initials next to the problem.
6. Subtract the remainder from the original **dividend** to find the new dividend for Player 2. Example: 200 – 13 = 187. The new dividend is 187.
7. Player 2 chooses from the remaining divisors and solves the division problem. Player 1 checks the solution with multiplication and addition.
8. Take turns until the starting number is 0 or until the dividend is smaller than all of the remaining divisors.
9. Both players find the sum of all their remainders. The player with the highest score wins.

Whiteboard: Keep the Leftovers Recording Sheet

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20

Starting Number	Equation	Initials
200		

Photo Credit: Lui, Tat Mun / Shutterstock.com

CONNECT

Ziad's Buttons Ziad works in a clothing factory that produces shirts. He has 100 buttons and needs 16 buttons for each shirt. After dividing, he thinks he has enough to make 6 shirts and will have 4 buttons left over. Is Ziad correct in his thinking? Why or why not? Explain your thinking.



Sewing a Button

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Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 7

Multistep Story Problems

Quick Code
egm5088

Learning Target

- I can solve multistep story problems involving whole numbers and the four operations.

ACCESS

Making Sense of Remainders Read the story problem, and look at the student work. Use the information provided to answer the question. Be prepared to justify your thinking.

1. A baker made 140 servings of baklava for a party. If each baking tray holds 12 servings of baklava, how many trays will be needed to hold all the baklava?

$$\begin{array}{r} 11 \text{ R8} \\ 12\overline{)140} \\ -\,12 \\ \hline 20 \\ -\,12 \\ \hline 8 \end{array}$$

2. Mom baked a batch of 12 balah el sham. Two balah el sham fell on the floor, leaving 10 on the platter. If 4 kids split the remaining balah el sham equally, how many balah el sham will each child get?

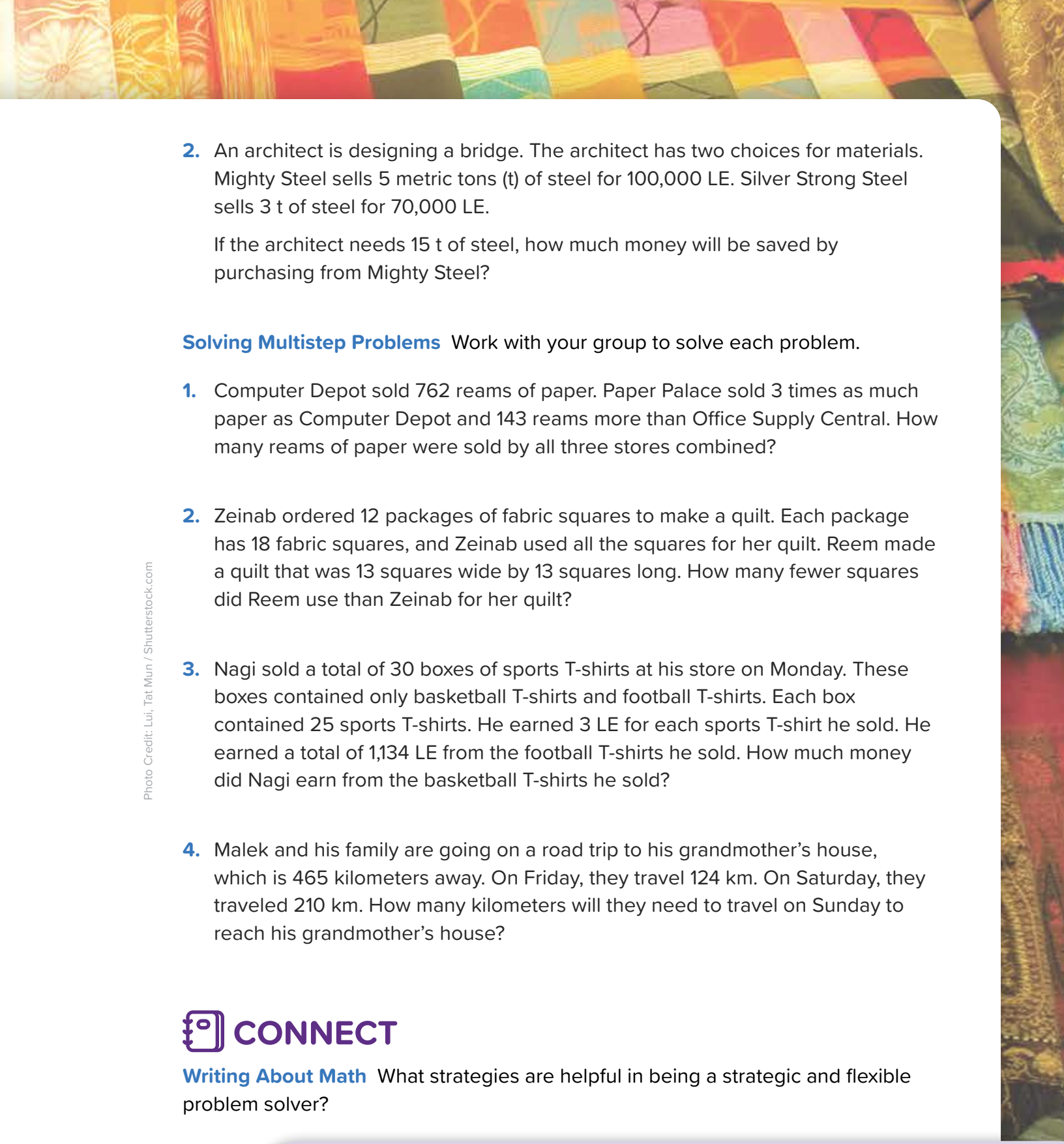
$$\begin{array}{r} 12 \\ -\,2 \\ \hline 10 \end{array} \qquad \begin{array}{r} 2 \text{ R2} \\ 4\overline{)10} \\ -\,8 \\ \hline 2 \end{array}$$

BUILD

Step by Step Read through the following problems and follow the prompts from your teacher.

1. In one year, a textile factory used 11,650 meters of cotton, 4,950 fewer meters of silk than cotton, and 3,500 fewer meters of wool than silk. How many meters of fabric were used in all?

Photo Credit: Lui, Tat Mun / Shutterstock.com



2. An architect is designing a bridge. The architect has two choices for materials. Mighty Steel sells 5 metric tons (t) of steel for 100,000 LE. Silver Strong Steel sells 3 t of steel for 70,000 LE.

 If the architect needs 15 t of steel, how much money will be saved by purchasing from Mighty Steel?

Solving Multistep Problems Work with your group to solve each problem.

1. Computer Depot sold 762 reams of paper. Paper Palace sold 3 times as much paper as Computer Depot and 143 reams more than Office Supply Central. How many reams of paper were sold by all three stores combined?

2. Zeinab ordered 12 packages of fabric squares to make a quilt. Each package has 18 fabric squares, and Zeinab used all the squares for her quilt. Reem made a quilt that was 13 squares wide by 13 squares long. How many fewer squares did Reem use than Zeinab for her quilt?

3. Nagi sold a total of 30 boxes of sports T-shirts at his store on Monday. These boxes contained only basketball T-shirts and football T-shirts. Each box contained 25 sports T-shirts. He earned 3 LE for each sports T-shirt he sold. He earned a total of 1,134 LE from the football T-shirts he sold. How much money did Nagi earn from the basketball T-shirts he sold?

4. Malek and his family are going on a road trip to his grandmother's house, which is 465 kilometers away. On Friday, they travel 124 km. On Saturday, they traveled 210 km. How many kilometers will they need to travel on Sunday to reach his grandmother's house?

Photo Credit: Lui, Tat Mun / Shutterstock.com

CONNECT

Writing About Math What strategies are helpful in being a strategic and flexible problem solver?

Check Your Understanding

Follow your teacher's instructions to complete this activity.

UNIT

5

Theme 2 | Mathematical Operations and Algebraic Thinking

Unit 5 Multiplication and Division with Decimals

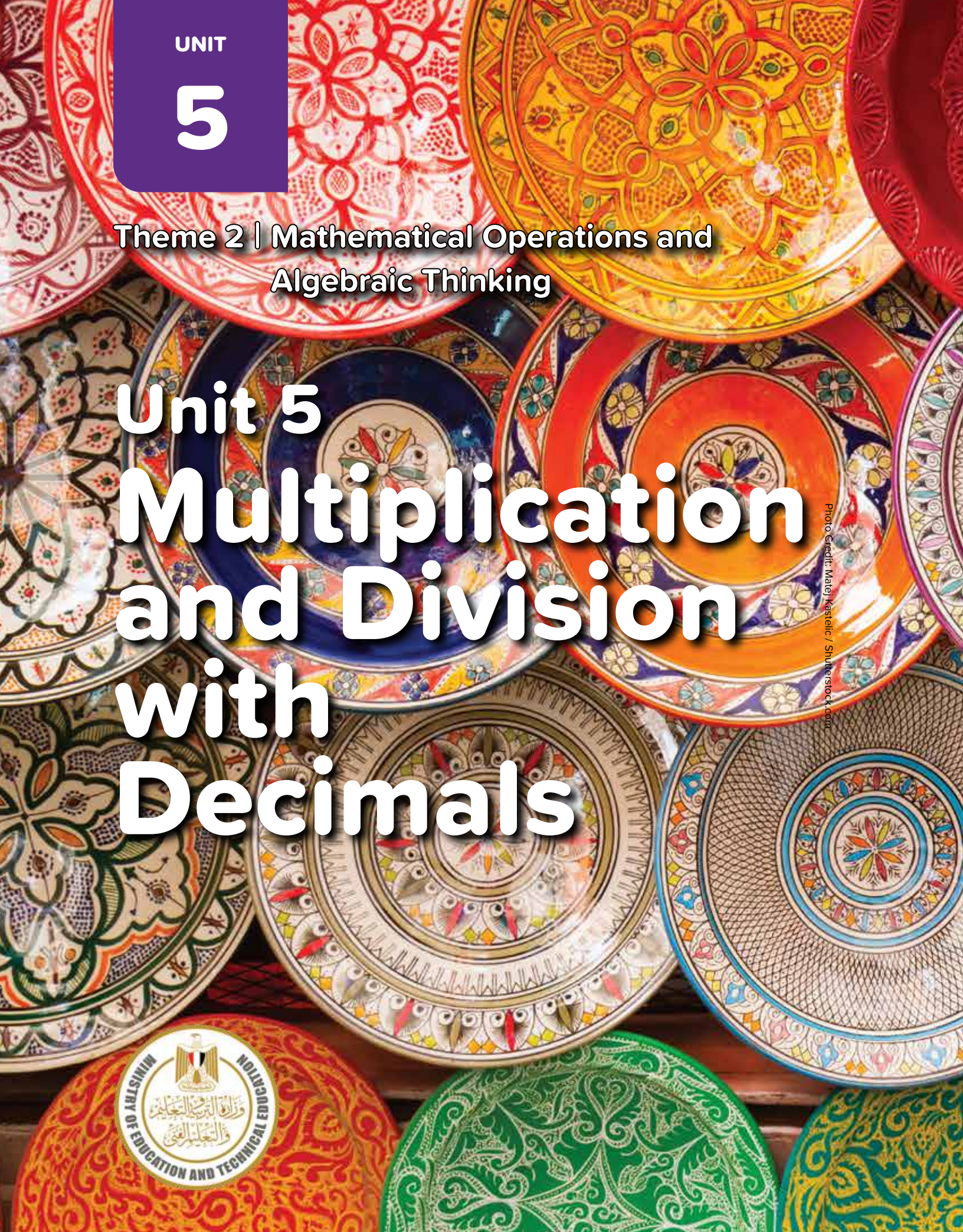


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MINISTRY OF EDUCATION AND TECHNICAL EDUCATION



Measuring Up

Unit Video Questions

Quick Code
egm5091

The Unit 5 Opener Video, Measuring Up, explores math around Egypt through multiplication and division with decimals. In this unit, you will use strategies involving place value to multiply and divide decimals. You will utilize decimals in investigating relationships between units in the metric system.

- [] How did multiplication and division with decimals help the students make sense of the world around them?
- [] What did the students discover about multiplying and dividing decimals?

Photo Credit: (a) Matej Kastelic / Shutterstock.com (b) BY-_BY / Shutterstock.com

CONCEPT
1

Multiplying Decimals

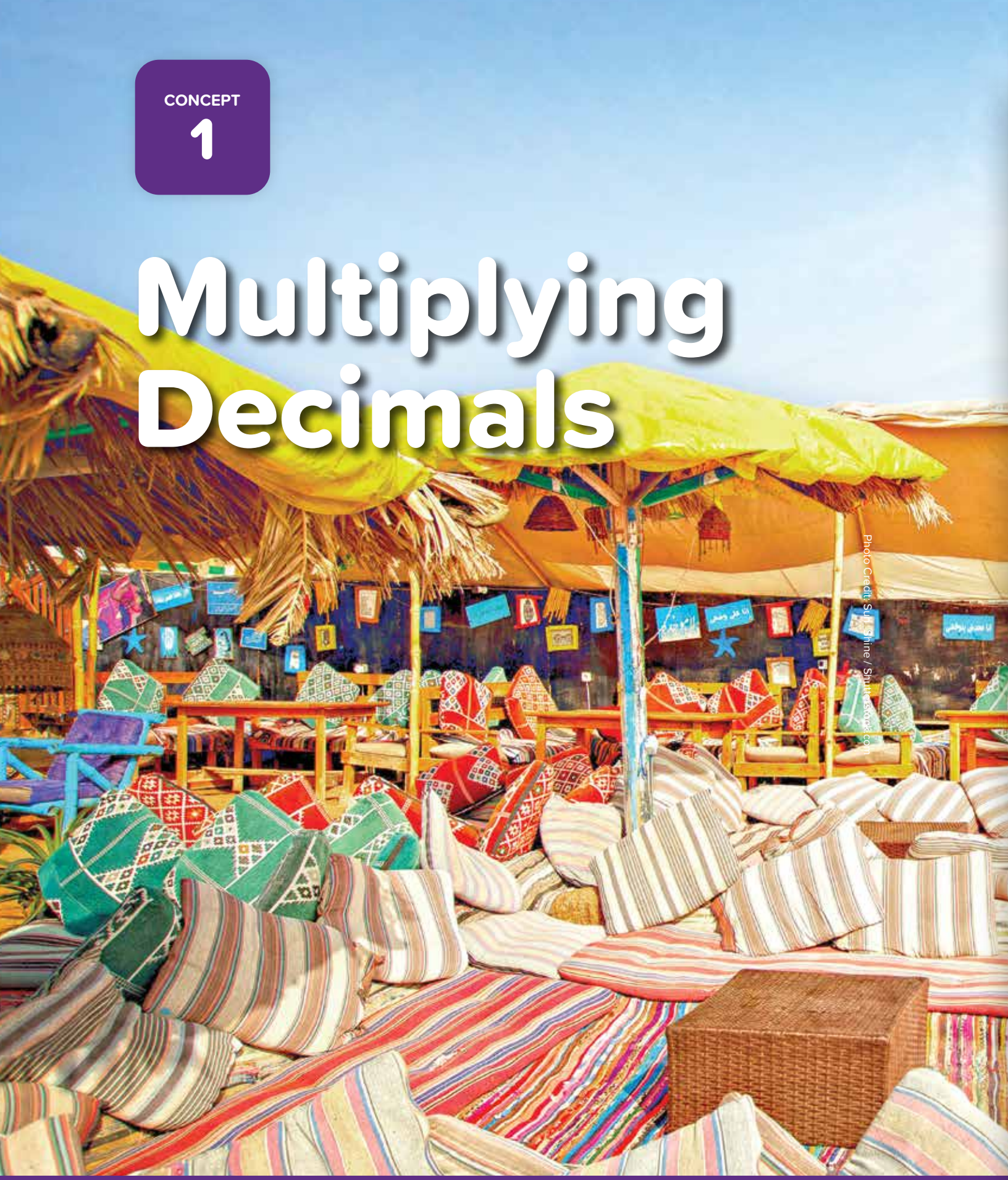


Photo Credit: Sue Cunningham / Shutterstock.com

LESSON 1

Multiplying by Powers of Ten

Quick Code egm5093

Learning Target

- I can explain patterns when multiplying whole numbers by **powers of ten.**

ACCESS

Missing Numbers Fill in the missing numbers in each equation.

1	10	100	1,000	10,000	100,000

1. $496 = 4 \times (A) + 9 \times (B) + 6$

2. $6{,}140 = 6 \times (C) + 1 \times (D) + 4 \times (E)$

3. $20{,}403 = 2 \times (F) + 4 \times (G) + 3$

4. $78{,}594 = 7 \times (H) + 8 \times (I) + 5 \times (J) + 9 \times (K) + 4$

5. $8{,}032 \times 1{,}000 = (L)$

Photo Credit: Sun_Shine / Shutterstock.com

BUILD

Looking for Patterns Look at the examples in Set 1.

Set 1

Examples	Products in Standard Form
3 × 2 Thousands = 6 Thousands	6,000
3 × 2 Hundreds = 6 Hundreds	600
3 × 2 Tens = 6 Tens	60
3 × 2 Ones = 6 Ones	6
3 × 2 Tenths = 6 Tenths	0.6
3 × 2 Hundredths = 6 Hundredths	0.06
3 × 2 Thousandths = 6 Thousandths	0.006

Now fill in the blanks for Set 2.

Set 2

1. $25 \times 1{,}000 =$ _____
2. $25 \times 100 =$ _____
3. $25 \times 10 =$ _____
4. $25 \times 1 =$ _____

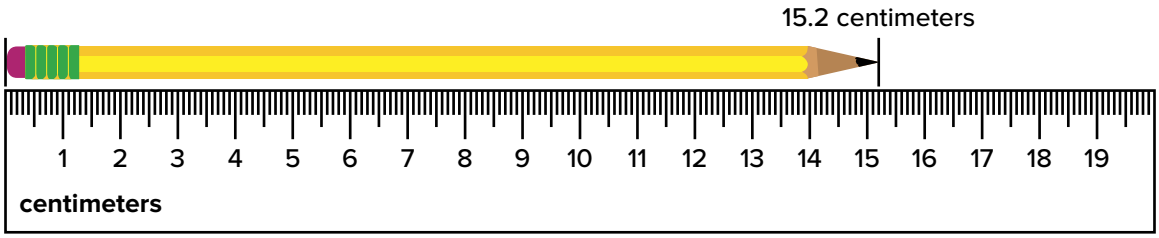
(Hint: What could you call the second factor in these problems?)

5. $25 \times 0.1 =$ _____
6. $25 \times 0.01 =$ _____
7. $25 \times 0.001 =$ _____

Photo Credit: Sun_Shine / Shutterstock.com

Pencil Problem Look at the diagram of Manal's pencil. Read the passage and answer the questions.

Manal works as an accountant helping businesses keep track of their income and expenses. Doing all this accounting wears down Manal's pencils quickly.



Answer the questions about Manal's pencil.

1. Manal's pencil is _____ centimeters long.

2. If her pencil were 10 times bigger, it would be _____ centimeters long.

 (pencil length $\times$ 10 = _____ cm)

3. If Manal were to line up 100 of the same pencils, the total length would be _____ centimeters.

 (pencil length $\times$ 100 = _____ cm)

4. If Manal's pencil were to shrink to one tenth of its current length, it would be _____ centimeters long.

 (pencil length $\times$ 0.1 = _____ cm)

Let's Try It Evaluate.

1. $4.2 \times 10 =$ _____
2. $360 \times 0.1 =$ _____
3. $7.4 \times 0.01 =$ _____
4. $1.245 \times 100 =$ _____
5. $602.1 \times 0.01 =$ _____
6. $14.14 \times 0.1 =$ _____

Photo Credit: Sun_Shine / Shutterstock.com

Let's Try More Evaluate.

Multiply to complete the table.

	1.	2.	3.
×	3	30	300
0.001	A. _____	G. _____	M. _____
0.01	B. _____	H. _____	N. _____
0.1	C. _____	I. _____	O. _____
1	D. _____	J. _____	P. _____
10	E. _____	K. _____	Q. _____
100	F. _____	L. _____	R. _____

CONNECT

Hoda's Stride Hoda's stride is 0.72 meters. How far, in meters, will Hoda walk after taking 1,000 paces? Use words and numbers to explain how you found your answer.



Walking Track

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Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 2

Multiplying Decimals by Whole Numbers

Quick Code
egm5095

Learning Target

- I can multiply a decimal by a whole number.

ACCESS

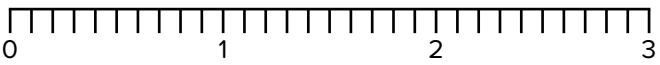
Multiplying Whole Numbers Complete the equations.

1. $773 \times 2 =$
2. $521 \times 9 =$
3. $385 \times 43 =$
4. $108 \times 26 =$
5. $497 \times 85 =$

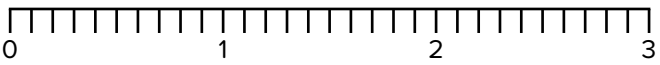
BUILD

Let's Try It Model the expressions. Then, rewrite each problem vertically and evaluate.

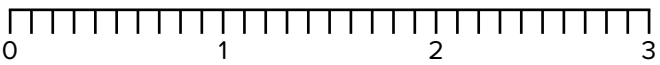
1. 0.3×3



2. 0.3×4



3. 0.3×5



4. 2.5×3

5. 0.35×5

Photo Credit: Sun_Shine / Shutterstock.com

HANDS-ON ACTIVITY

Make the Greatest Product

Play the game with your partner.

- Player 1 spins the spinner. Both players record the digit in one of the boxes. (Players should record the digits in different boxes.)
- Player 2 spins and both players record the digit.
- Take turns until all of the boxes are filled. You may not move a digit once it has been written.
- Players solve the multiplication problem they formed. The player with the greatest product wins the round.

Whiteboard: Make the Greatest Product Use the Whiteboard to create and solve multiplication problems.

Make the Greatest Product

Round	Problem	Product
1.	□ . □ × □	
2.	0 . □ □ × □	
3.	□ . 0 □ × □	
4.	□ . □ □ × 4	
5.	5 . □ □ × □	

Photo Credit: Sun_Shine / Shutterstock.com

6.	0 . □ □ 6 × □	
7.	□ . □ × □ 7	
8.	□ . 8 9 × □ □	
		Total → □

Challenge Add the sum of your products. The player with the greatest sum is the champion.

CONNECT

Math at Work Ameen owns a bookstore. He uses multiplication to calculate how much he earned from selling items at his store. Sometimes, he has difficulty knowing where to place the decimal point in the product. Write an explanation to help Ameen. Use words and numbers to support your thinking.



Bookstore

Photo Credit: (a) Sun_Shine / Shutterstock.com, (b) Victor Jiang / Shutterstock.com

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 3

Multiplying Tenths by Tenths

Quick Code
egm5097

Learning Targets

- I can use models to represent multiplying decimals.
- I can explain patterns when multiplying tenths by tenths.

ACCESS

The Debate Read the story. Choose the student you think is correct. Use words and numbers to explain your thinking.

Kamal and Nadia are having a debate in math class. Their teacher asked them what place value the product would be in if they multiplied two numbers in the Tenths place, such as 0.5 and 0.7.

Kamal said the Tenths place because multiplication makes numbers greater. Multiplication is repeated addition, so Tenths times Tenths would be adding a lot of Tenths together and that would make more Tenths or a whole number.

Nadia said the Hundredths place, because $10 \times 10 = 100$, so the product of two numbers in the Tenths place would have a product in the Hundredths place.

Who do you think is correct? Explain your thinking.

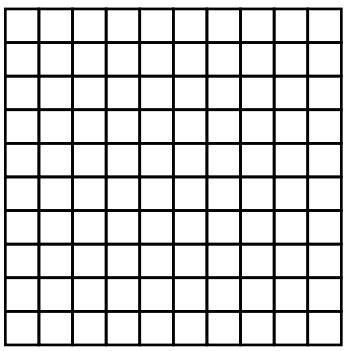
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BUILD

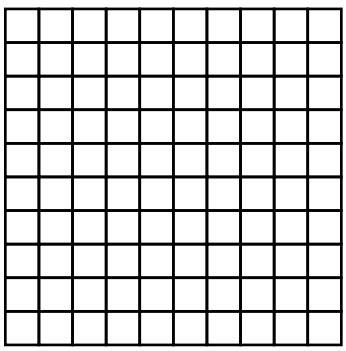
Multiplying with Arrays Work with your teacher to explore multiplying decimals with arrays.

Exploring with Tenths Use the Base 10 grids to find the products.

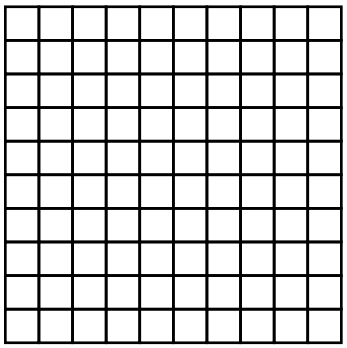
1. $0.1 \times 0.1 =$ _____



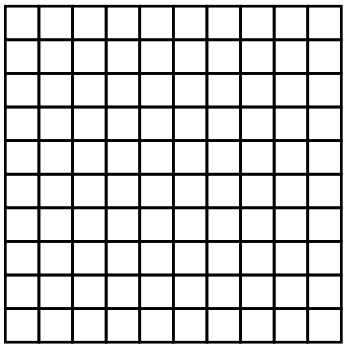
2. $0.3 \times 0.4 =$ _____



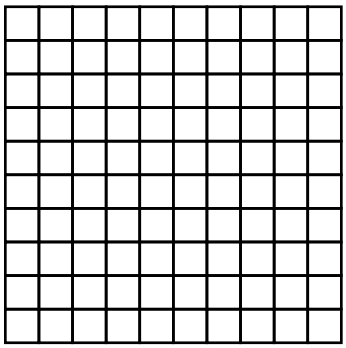
3. $0.5 \times 0.2 =$ _____



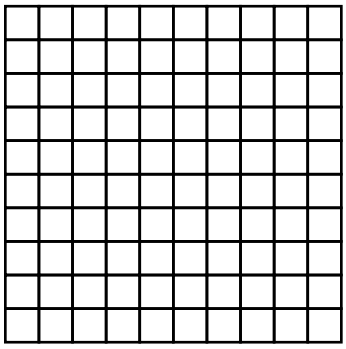
4. $0.7 \times 0.8 =$ _____



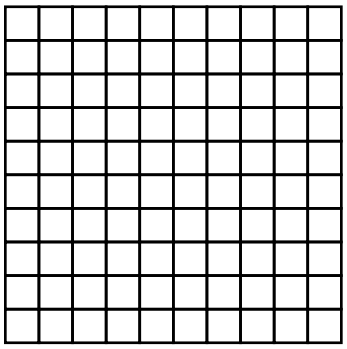
5. $0.9 \times 0.5 =$ _____



6. $0.5 \times 0.6 =$ _____



7. $1.6 \times 0.4 =$ _____



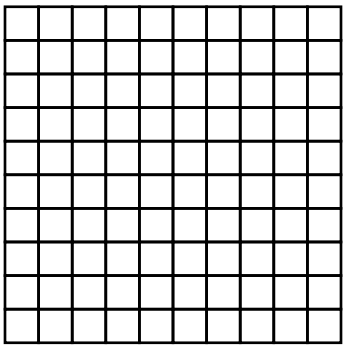


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CONNECT

Writing About Math Your friend was absent and missed today's math lesson. Explain why the product is in the Hundredths when multiplying Tenths by Tenths.

Use Whiteboard: Base 10 Grids or create two grids in your journal to provide an example to help your friend understand the concept.

Whiteboard: Writing About Math Use the given Base 10 grids or create two grids in your journal for use in the next task.

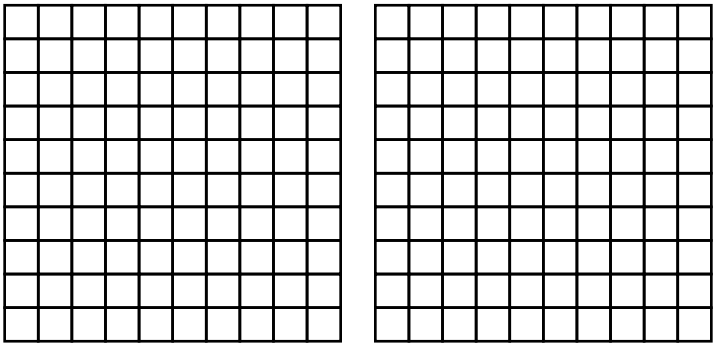


Photo Credit: Sun_Shine / Shutterstock.com

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 4

Estimating Decimal Products

Quick Code
egm5099

Learning Target

- I can estimate products of decimals.

ACCESS

Rounding Decimals Round items 1–3 to the nearest whole number. Round items 4–8 to the Tenths place.

1. 24.3
2. 1.86
3. 19.52
4. 37.44
5. 649.825
6. 0.839
7. 69.248
8. 174.496

BUILD

Estimating Decimal Products Estimate the products by rounding or using compatible numbers.

1. 24.3×1.8 Estimate: _____
2. 8.2×11.5 Estimate: _____
3. 6.7×11.5 Estimate: _____
4. 99.6×12.7 Estimate: _____
5. 58.25×99.3 Estimate: _____
6. 649.9×0.8 Estimate: _____
7. 47.1×33.6 Estimate: _____
8. 450.321×2.2 Estimate: _____
9. 121.352×3.8 Estimate: _____

Photo Credit: Sun_Shine / Shutterstock.com

Meal Planning Ezz is a public health nutritionist. Use the table and chart to help him plan three different shopping options for his clients. Each client has 2,000 LE to spend per month on food.

Select the items you would like to purchase and decide how many of each (the quantity) you will buy. Estimate to find the total spent per item. Keep a running total and make sure to stay close to 2,000 LE.

Milk (regular), (0.25 L)	3.69 LE
Loaf of Fresh White Bread (125.00 g)	2.40 LE
Rice (white), (0.10 kg)	1.12 LE
Eggs (one dozen)	21.60 LE
Local Cheese (0.10 kg)	5.19 LE
Chicken Fillets (0.15 kg)	10.73 LE
Beef Round (0.15 kg) (or Equivalent Back Leg Red Meat)	20.31 LE
Apples (0.30 kg)	7.28 LE
Bananas (0.25 kg)	3.18 LE
Oranges (0.30 kg)	2.42 LE
Tomatoes (0.20 kg)	1.28 LE
Potatoes (0.20 kg)	1.22 LE
Onions (0.10 kg)	0.61 LE
Lettuce (0.20 head)	0.94 LE

Photo Credit: Sun_Shine / Shutterstock.com

Example

Food Item	Actual Cost LE	Rounded Cost LE	Quantity	Equation	Running Total Estimated Cost LE
Eggs	21.60	22	10	$22 \times 10 = 220$	220
Cheese	5.19	5	30	$5 \times 30 = 150$	$220 + 150 = 370$

1.

Food Item	Actual Cost LE	Rounded Cost LE	Quantity	Equation	Running Total Estimated Cost LE

2.

Food Item	Actual Cost LE	Rounded Cost LE	Quantity	Equation	Running Total Estimated Cost LE

Photo Credit: Sun_Shine / Shutterstock.com

3.

Food Item	Actual Cost LE	Rounded Cost LE	Quantity	Equation	Running Total Estimated Cost LE

CONNECT

Math at Work Nadia is a museum curator. She wants to repaint the gallery walls, which are measured in meters.

There are four walls, each measuring 3.8 m × 15.2 m. Estimate how many square meters she needs to cover with paint. Explain your thinking.



Painting Supplies

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Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 5

Using the Area Model to Multiply Decimals

Quick Code
egm5101

Learning Target

- I can use the **area model** to multiply decimals.

ACCESS

Area Model Puzzles Look at the area models. Some of the numbers are missing. Use the information provided to fill in the blanks.

Write the problem, and then find the product. Be prepared to share your reasoning or strategy for finding what was missing in each diagram.

1.

	20	8
50	1,000	?
?	80	32

Product: _____

2.

	30	4
50	1,500	200
?	60	?

Product: _____

3.

	40	?
80	3,200	560
?	120	21

Product: _____

4.

	?	6
60	1,200	360
?	80	24

Product: _____

5.

	?	?	5
30	12,000	600	150
?	1,600	80	?

Product: _____

Photo Credit: Sun_Shine / Shutterstock.com

BUILD

Extending Multiplication Patterns Look for patterns in each set of problems. Use the patterns to complete the unanswered problems.

1. $80 \times 3 = 240$

$8 \times 30 = 240$

$8 \times 3 =$ _____

$0.8 \times 3 =$ _____

$8 \times 0.3 = 2.4$

$0.8 \times 0.3 =$ _____

$0.08 \times 0.3 =$ _____

$0.8 \times 0.03 =$ _____

$0.08 \times 0.03 =$ _____

2. $7 \times 600 = 4{,}200$

$7 \times 60 =$ _____

$7 \times 6 = 42$

$7 \times 0.6 =$ _____

$7 \times 0.06 = 0.42$

$0.7 \times 0.6 =$ _____

$0.7 \times 0.06 =$ _____

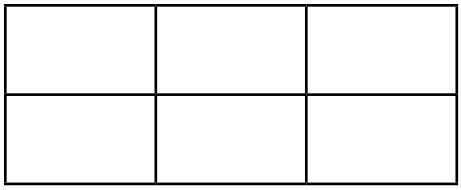
$0.07 \times 0.06 =$ _____

Decimal Area Models Use an area model to complete each problem.

1. $1.3 \times 6.8 =$ _____



2. $29.3 \times 0.34 =$ _____



3. $4.2 \times 5.6 =$ _____

4. $7.3 \times 0.49 =$ _____

Photo Credit: Sun_Shine / Shutterstock.com

5. $5.7 \times 9.1 =$ _____

6. $18.2 \times 2.8 =$ _____

7. $3.55 \times 0.75 =$ _____

8. $70.9 \times 4.6 =$ _____

CONNECT

Math at Work Malak works for a construction company. The company had 12 pallets of cinder blocks delivered for a building project. Each pallet weighed 1.36 metric tons.

Help Malak revise and complete the area model to figure out how much the cinder blocks weighed all together. If necessary, place a decimal point in the partial products. Use estimation to explain why your answer is reasonable.

	1	0.3	0.06
10	10	30	6
2	2	6	12

Photo Credit: Sun_Shine / Shutterstock.com

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 6

Multiplying Decimals through the Hundredths Place

Quick Code
egm5103

Learning Targets

- I can use the standard algorithm to multiply decimals through the Hundredths place.
- I can use estimation to check the reasonableness of my answers.

ACCESS

Place the Decimal Point Math is important to doctors. Doctors must be precise in their calculations and measurements, especially when prescribing medicine for their patients. Misplacing a decimal point can be problematic.

The digits of the product for each problem have been provided, but the decimal point is missing. Without multiplying, use your reasoning to place the decimal point correctly in the product.



Measuring Blood Pressure

Photo Credit: (a) Sun_Shine / Shutterstock.com, (b) Andrey_Popov / Shutterstock.com

1. $5.8 \times 7.4 =$ _____

 4,292

2. $32.4 \times 5.3 =$ _____

 17,172

3. $11.68 \times 2.4 =$ _____

 28,032

4. $15.4 \times 0.49 =$ _____

 7,546

BUILD

Same and Different Review both completed problems shown. Identify what is the same and what is different in the problems. Be prepared to share your thinking with the class.

$\overset{2}{}$	$\overset{2}{}$
43	4.3
$\times$ 18	$\times$ 0.18
344	344
+ 430	+ 430
774	0.774

Using the Standard Algorithm for Decimal Numbers Find the product for each multiplication problem using the standard algorithm.

1. 29.35
$\times$ 3.4

2. 43.2
$\times$ 0.24

3. 2.43
$\times$ 6.9

4. 12.87
$\times$ 7.3

5. 8.92
$\times$ 0.17

6. 1.74
$\times$ 35

7. 10.21
$\times$ 0.64

8. 47.8
$\times$ 5.2

Photo Credit: Sun_Shine / Shutterstock.com



CONNECT

Writing About Math Two students are having a discussion based on the student work shown here. Read their discussion and respond to the prompt.

$$\begin{array}{r} 42.16 \\ \times\ \ 3.4 \\ \hline \end{array}$$

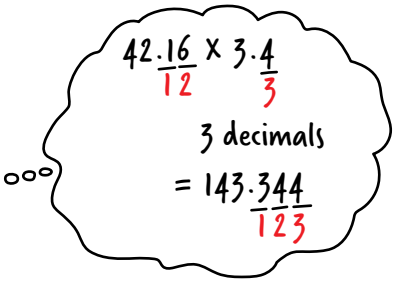
estimate

$42 \times 3 = 126$

$$\begin{array}{r} {}^{2}42.16 \\ \times\ \ 3.4 \\ \hline 16864 \\ 126480 \\ \hline 143.344 \end{array}$$

Dalal: I know the student placed the decimal correctly because 143.344 is close to her estimate of 126.

Doha: I know she placed the decimal correctly because the final product has three decimal places and there are three decimal places altogether in both factors of the problem.



Do you agree with Dalal or Doha? Can you count decimal places in the factors to place the decimal in the product? Explain your thinking.

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Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 7

Multiplying Decimals through the Thousandths Place

Quick Code
egm5105

Learning Targets

- I can use the standard algorithm to multiply decimals through the Thousandths place.
- I can use estimation to check the reasonableness of my answers.

ACCESS

Place the Decimal Points Math is important to architects. Architects draw blueprints to design buildings that are safe and beautiful. Misplacing a decimal point can cause problems during construction.

The correct product for each problem has been given. Without multiplying, use reasoning to place the decimal point correctly in one or both factors. More than one correct answer is possible.

1. $38 \times 64 = 24.32$

2. $532 \times 17 = 9.044$

3. $18 \times 145 = 261$

4. $826 \times 43 = 3{,}551.8$

Photo Credit: Sun_Shine / Shutterstock.com

BUILD

Making Sense of the Standard Algorithm Use the standard algorithm to find the products.

1. 7.184
$\times$ 6.3

2. 2.607
$\times$ 41

3. 5.328
$\times$ 7.9

4. 8.108
$\times$ 0.45

5. 6.429
$\times$ 1.9

6. 8.375
$\times$ 20

Photo Credit: Sun_Shine / Shutterstock.com

CONNECT

Writing About Math Reflect on the Essential Question: How does understanding place value help to multiply decimals more efficiently?

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 8

Decimals and the Metric System

Quick Code
egm5107

Learning Targets

- I can explain relationships between the metric system and decimals.
- I can use decimals to represent **equivalent** measurements.

ACCESS

What Would You Use? Look at each image. Select the most appropriate unit of measurement from the given terms to measure the length of each object. Then, answer the question.

millimeters centimeters meters kilometers



1. Pencil: Unit of measure _____



2. Height of building: Unit of measure _____



3. Length of dinner table: Unit of measure _____

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4. Length of the Nile River: Unit of measure _____



5. Length of insect: Unit of measure _____

6. Describe the relationship between millimeters, centimeters, meters, and kilometers.

Photo Credit: (a) Sun_Shine / Shutterstock.com, (b) SRStudio / Shutterstock.com, (c) jiade / Shutterstock.com

BUILD

Back-to-Back, Front-To-Front Follow your teacher's directions to play Back-to-Back, Front-to-Front with your classmates.

Metric Measurements as Decimals Complete the chart. Use whole numbers and decimals to write equivalent measurements.

1. Measurements for Length

Unit of Measurement	In Millimeters	In Centimeters	In Meters
Millimeter	1		
Centimeter		1	
Meter			1

2. Measurements for Mass

Unit of Measurement	In Grams	In Kilograms
Gram	1	
Kilogram		1

3. Measurements for Capacity

Unit of Measurement	In Milliliters	In Liters
Milliliter	1	
Liter		1

Photo Credit: Sun_Shine / Shutterstock.com

Metric Match Select the equivalent measurement.

1.	10,870 g = _____ kg	1,087	108.7	10.87	1.087
2.	3,465 mL = _____ L	0.3465	3.465	34.65	346.5
3.	22 cm = _____ m	2,200	220	2.2	0.22
4.	0.7 m = _____ cm	7	70	700	7,000
5.	17.6 kg = _____ g	0.176	1.76	1,760	17,600
6.	95 mm = _____ cm	9.5	950	9,500	95,000
7.	19,629 mL = _____ L	1,962.9	196.29	19.629	1.9629
8.	3.3 m = _____ cm	33	330	3,300	33,000
9.	700 g = _____ kg	7,000	70	7	0.7
10.	694 mm = _____ cm	6,940	69.4	6.94	0.694
11.	2.5 L = _____ mL	2,500	250	25	0.25
12.	7.8 cm = _____ 78 mm	0.078	0.78	78	780

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CONNECT

Math at Work Yousra is a veterinarian. She needs to weigh a cat to see if it is healthy.

Yousra records that the cat weighs 3.648 kilograms. Her assistant records that the cat weighs 3,648.0 grams.

Do you agree with Yousra or her assistant? Why?

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 9

Measurement, Decimals, and Powers of Ten

Quick Code
egm5109

Learning Target

- I can relate converting measurements in the metric system to multiplying by powers of ten.

ACCESS

Powers of Ten Complete each equation. Discuss the difference between powers of 10 and multiples of 10.

1. $425 \times 10 =$ _____

2. $3.7 \times 100 =$ _____

3. $0.94 \times 0.1 =$ _____

4. $425 \times$ _____ $= 0.425$

5. $3.7 \times$ _____ $= 0.37$

6. $0.94 \times$ _____ $= 940$

7. _____ $\times 1{,}000 = 1{,}800$

8. _____ $\times 0.1 = 0.6512$

9. _____ $\times 100 = 89.3$

BUILD

Converting Measurements Use multiplication and powers of 10 to convert the measurements.

1. Amgad is a weightlifter. He needs to drink about 4,230 milliliters of water every day. How many liters of water does he need? Select the multiplication problem that could be used to answer the question.

A. $4{,}230 \times 1{,}000$

B. $4{,}230 \times 100$

C. $4{,}230 \times 0.01$

D. $4{,}230 \times 0.001$

2. 142 centimeters = ? meters

142 cm × _____ = _____ m

3. 317 kilograms = ? grams

317 kg × _____ = _____ g

Photo Credit: Sun_Shine / Shutterstock.com

Identify the Correct Conversion Study each problem. In each problem, mark whether the multiplication given to complete the conversion is correct. Select Y for yes and N for no. Then, complete all conversions by filling in each blank with the equivalent measurement (even if the conversion is incorrect).

A. 0.007 kg = _____ g 0.007 × 1,000 Y / N	G. 4 cm = _____ m 4 × 0.01 Y / N	M. 1.5 m = _____ cm 1.5 × 0.01 Y / N	T. 0.8 cm = _____ mm 0.8 × 0.1 Y / N
B. 51 mm = _____ cm 51 × 10 Y / N	H. 500 mL = _____ L 500 × 1,000 Y / N	N. 6,410 cm = _____ m 6,410 × 0.01 Y / N	U. 10.3 m = _____ cm 10.3 × 0.01 Y / N
C. 230 cm = _____ m 230 × 0.01 Y / N	I. 5.67 m = _____ cm 5.67 × 10 Y / N	P. 6,410 m = _____ km 6,410 × 0.001 Y / N	V. 9,320 mm _____ cm 9,320 × 10 Y / N
D. 4,800 mL = _____ L 4,800 × 0.1 Y / N	J. 782 mm = _____ cm 782 × 10 Y / N	Q. 350 cm = _____ m 350 × 0.01 Y / N	W. 9,320 cm = _____ m 9,320 × 0.01 Y / N
E. 10 mm = _____ cm 10 × 0.1 Y / N	K. 782 m = _____ km 782 × 0.001 Y / N	R. 5.5 kg = _____ g 5.5 × 1,000 Y / N	X. 0.97 kg = _____ g 0.97 × 1,000 Y / N
F. 500 m = _____ km 500 × 0.001 Y / N	L. 315 cm = _____ m 315 × 0.01 Y / N	S. 3,250 cm = _____ mm 3,250 × 0.1 Y / N	Y. 970 cm = _____ m 970 × 100 Y / N

Photo Credit: Sun_Shine / Shutterstock.com

CONNECT

Math at Work There are two categories of weightlifting: the Snatch and the Clean and Jerk. World Champion Egyptian weightlifter Mohamed Ehab wants to compare his personal best in these two categories. In the Snatch, he was able to lift 173 kilograms. He was able to lift 201,000 grams in the Clean and Jerk. Use multiplication and powers of 10 to explain which measurement is greater.



Barbell

Photo Credit: (a) Sun_Shine / Shutterstock.com, (b) sportpoint / Shutterstock.com

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 10

Solving Multistep Story Problems

Quick Code
egm5111

Learning Target

- I can solve multistep story problems involving addition, subtraction, and multiplication of decimals.

ACCESS

Write a Story Problem Write a story problem for 342×0.001. Your problem must include a measurement conversion, so be sure to include the units in your scenario.

BUILD

What Do You Know? Read each story problem. Discuss with your partner how to solve each problem. Once you agree on a plan, work together to answer the question. Be sure to label your answers with the correct unit of measure.

1. Marwan is a computer engineer. The computer he is repairing is currently in three pieces that have a mass of 2 kilograms, 600 grams, and 0.03 kg. His manager is waiting for the last piece, which has a mass of 1,750 g, to arrive. What will the mass of the computer be when it is completely assembled?



Repairing a Computer

Photo Credit: (a) Sun_Shine / Shutterstock.com, (b) Ekkaratk / Shutterstock.com

2. Rania is a nurse in a hospital. She is getting wrap bandages from the storage closet for her patients. She needs 1.35 meters of bandages for each of her 4 patients. There are 250 centimeters in each package. How many packages does she need? _____

 How many, if any, will be left over? _____

3. Dalia made a liter of sugar cane juice. She drank 320 milliliters. Her father drank 0.25 liters. How much sugar cane juice is remaining? _____

4. Ehab wants to know how much he has grown this year. In January, he was 138.2 centimeters. By the end of the year, he was 1.5 meters tall. How much did Ehab grow this year? _____

5. Ehab's twin sister Eman also wants to know how much she grew. In January, she was 1.34 meters. At the end of the year, she was 145 centimeters. Who grew more—Ehab or Eman? _____ How much more? _____

Photo Credit: Sun_Shine / Shutterstock.com

CONNECT

Math at Work Read the story problem. Record your problem-solving plan. Use words, numbers, or pictures to explain how to solve the problem.

Marwan is designing a new circuit board for the computer he is repairing. The old circuit board measured 7.25 centimeters by 36 millimeters. He planned for the new circuit board to be 80 mm by 5.5 cm. What is the difference in area of the circuit boards?

Check Your Understanding

Follow your teacher's instructions to complete this activity.

CONCEPT
2

Dividing Decimals

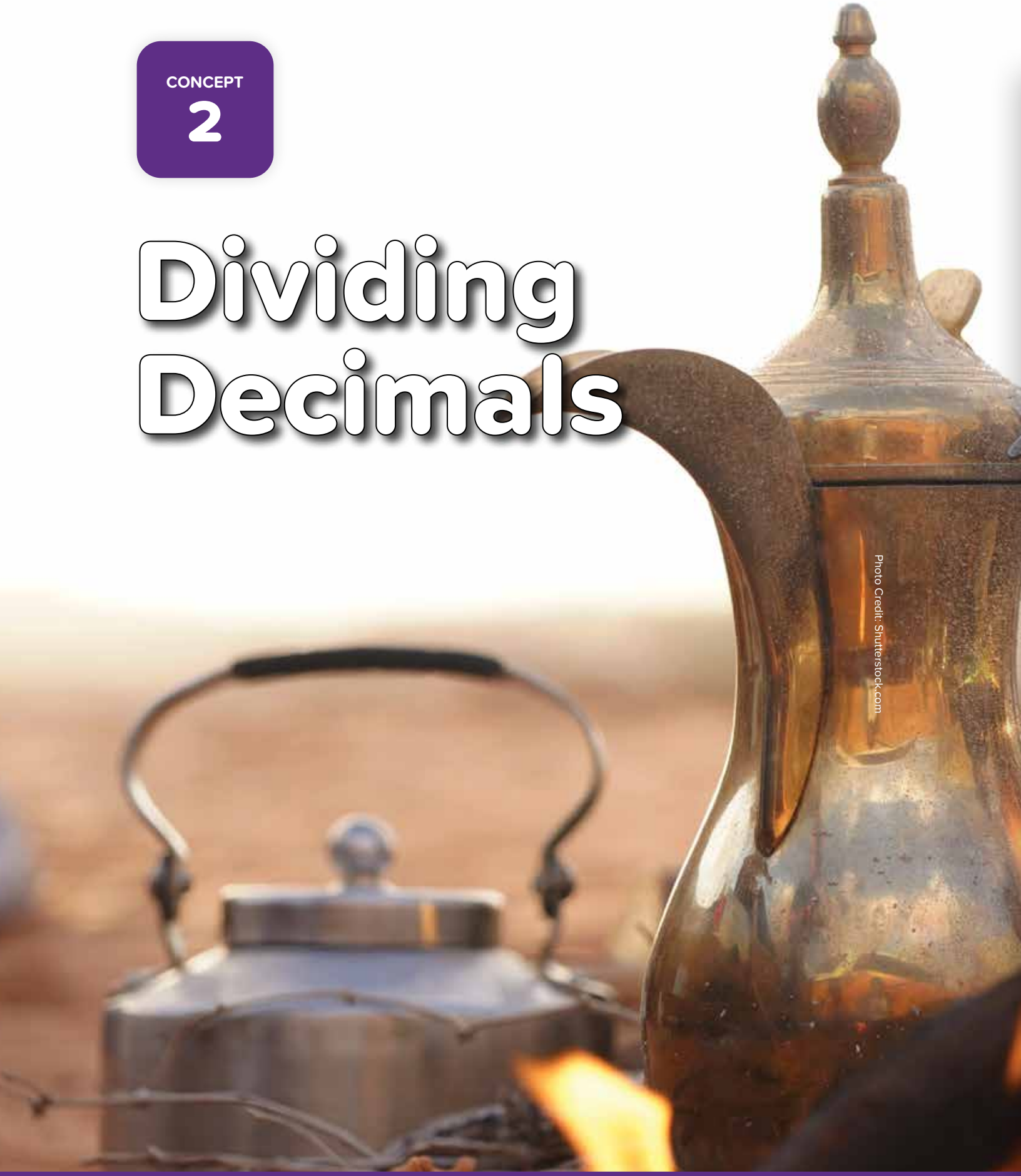


Photo Credit: Shutterstock.com

LESSON 11

Dividing by Powers of Ten

Quick Code egm5114

Learning Target

- I can explain patterns I notice when dividing by powers of 10.

ACCESS

Division Practice Use any division strategy to find the quotients.

1. 515 ÷ 5 = _____
2. 690 ÷ 7 = _____
3. 2,402 ÷ 21 = _____
4. 812 ÷ 13 = _____
5. 7,633 ÷ 32 = _____

BUILD

Dividing by Powers of Ten Complete each division problem mentally. Look for patterns to predict the placement of the decimal point.

1. 2,500 ÷ 100 = _____
2. 2,500 ÷ 10 = _____
3. 2,500 ÷ 1 = _____
4. 2,500 ÷ 0.1 = _____
5. 2,500 ÷ 0.01 = _____
6. 2,500 ÷ 0.001 = _____

Challenge 2,500 ÷ 1,000 = _____

Photo Credit: Shutterstock.com

Fill It In Use the patterns you have just discovered to complete the division.

1. 800 ÷ 100 = _____

 800 ÷ 10 = _____

 800 ÷ 1 = _____

 800 ÷ 0.1 = _____

 800 ÷ 0.01 = _____

2. 6,700 ÷ 1,000 = _____

 6,700 ÷ 100 = _____

 6,700 ÷ 10 = _____

 6,700 ÷ 1 = _____

 6,700 ÷ 0.1 _____

 6,700 ÷ 0.01 = _____

3. 32 ÷ 10 = _____
4. 5.7 ÷ 0.1 = _____
5. 5.7 ÷ 100 = _____
6. 2.16 ÷ 0.01 = _____
7. 71 ÷ 1,000 = _____
8. 12.8 ÷ 0.01 = _____
9. 0.4 ÷ 10 = _____
10. 0.4 ÷ 0.001 = _____
11. 29.08 ÷ 0.1 = _____
12. 102.3 ÷ 0.01 = _____

Photo Credit: Shutterstock.com

CONNECT

How Hot? Temperatures must reach at least 1,100°C for glass to be blown or for earthenware clay to harden. Water boils at about one-tenth of that temperature. Select the choice that is closest to the temperature at which water boils.

A. $1{,}100 \times 10$ B. $1{,}100 \div 10$ C. $1{,}100 \times 0.1$ D. $1{,}100 \div 0.1$



Handmade Pottery

Photo Credit: (a) Shutterstock.com, (b) Mohammed younos / Shutterstock.com

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 12

Patterns and Relationships in Powers of Ten

Quick Code
egm5116

Learning Target

- I can make connections between multiplying and dividing by powers of ten.

ACCESS

Human Equations Follow your teacher's directions to create and solve multiplication and division problems with your classmates.

BUILD

The Answer Is . . . Your teacher will assign you to a group. Evaluate the expressions in the set for your assigned group. Think about how you knew which way to move the decimal point.

Group 1	Group 2
$510.05 \times 0.001 =$ _____	$510.05 \div 0.001 =$ _____
$510.05 \times 0.01 =$ _____	$510.05 \div 0.01 =$ _____
$510.05 \times 0.1 =$ _____	$510.05 \div 0.1 =$ _____
$510.05 \times 10 =$ _____	$510.05 \div 10 =$ _____
$510.05 \times 100 =$ _____	$510.05 \div 100 =$ _____
$510.05 \times 1{,}000 =$ _____	$510.05 \div 1{,}000 =$ _____

Photo Credit: Shutterstock.com

Same Answer, Inverse Operation Complete each equation with the correct power of 10. Be sure to look carefully at the given operation.

1.	$14.6 \times _____ = 146$	$14.6 \div _____ = 146$
2.	$387.23 \times _____ = 3.8723$	$387.23 \div _____ = 3.8723$
3.	$9.102 \times _____ = 910.2$	$9.102 \div _____ = 910.2$
4.	$65 \times _____ = 6{,}500$	$65 \div _____ = 6{,}500$
5.	$0.39 \times _____ = 0.039$	$0.39 \div _____ = 0.039$
6.	$0.75 \times _____ = 750$	$0.75 \div _____ = 750$
7.	$28.4 \times _____ = 0.284$	$28.4 \div _____ = 0.284$
8.	$150.8 \times _____ = 150{,}800$	$150.8 \div _____ = 150{,}800$

Metric Conversions with Multiplication and Division Complete each conversion. Then, write a multiplication equation and a division equation with the same answer.

Example: 357 cm = 3.57 m

$357 \times 0.01 = 3.57$

$357 \div 100 = 3.57$

1. 712 mL = _____ L

$712 \times _____ = _____$

$712 \div _____ = _____$

2. 23 m = _____ cm

$23 \times _____ = _____$

$23 \div _____ = _____$

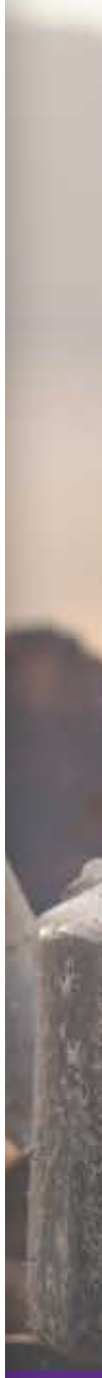


Photo Credit: Shutterstock.com

3. 300 g = _____ kg

300 × _____ = _____

300 ÷ _____ = _____

4. 5,200 mm = _____ m

5,200 × _____ = _____

5,200 ÷ _____ = _____

5. 5,200 mm = _____ cm

5,200 × _____ = _____

5,200 ÷ _____ = _____

CONNECT

Math at Work Nour is making a new drink to sell at his juice stall by combining mango juice, orange juice, and guava juice. Look at the recipe to help him decide which container you think he should use to mix his new drink. Explain your choice using multiplication and division.



Measuring Juice

2,250 mL of mango juice

0.95 L of orange juice

650 mL of guava juice

Identify the container you think it is best for Nour to use: 3 L 4 L 5 L

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Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 13

Modeling Decimal Division

Quick Code
egm5118

Learning Targets

- I can explain the meaning of decimal division problems.
- I can use models to represent decimal division.

ACCESS

Understanding Division Story Problems Read the problems with your group and think about what is happening in each situation. Discuss how the problems are similar and how the problems are different.



Jewelry Making

1. Hazem is making jewelry. He has 1,632 beads. He is asked to use the same number of beads on each of 24 necklaces.
2. Manal is also making jewelry. She has 1,632 beads. She is asked to use 24 beads on each necklace.

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BUILD

Interpreting Decimal Division Read each story problem. Determine whether the quotient represents how many groups or how many in each group. Be prepared to share your reasoning.

1. Amal had 4.32 meters of string. Each bracelet she makes uses 0.96 m of string. How many bracelets can Amal make?

2. Amir and his mother traveled 134.4 kilometers over 3 days, traveling the same distance each day. How many kilometers did Amir and his mother travel in 1 day?

3. Five bakers shared 8.9 kilograms of sugar equally. How much sugar did they each receive?

4. A rope that is 8.9 meters long is cut into 3 equal pieces. How long is each piece?

5. Hoda is making hair bows. She has 5.6 meters of fabric. Each hair bow is made from 0.34 m of fabric. How many bows can Hoda make?

6. A team of workers construct 0.75 kilometers of road each day. How long will it take them to construct 26.8 km of road?

7. Kamel has a 6.83 kilograms bag of peanuts. He split the peanuts evenly into 5 bags. What is the weight of each bag of peanuts?

Modeling Decimal Division Use your Base 10 blocks to model the problem. Write the quotient for each division.

1. $2.4 \div 0.4 =$ _____
2. $3.6 \div 8 =$ _____
3. $2 \div 0.4 =$ _____
4. $8.4 \div 1.2 =$ _____
5. $9.8 \div 5 =$ _____
6. $7 \div 4 =$ _____

Photo Credit: Shutterstock.com

CONNECT

Writing About Math Create a story problem that involves division of decimals. Explain the meaning of your story problem and whether the quotient represents how many groups or how many in each group. You do not need to solve your story problem.

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 14

Estimating Decimal Quotients

Quick Code
egm5120

Learning Target

- I can estimate **quotients** of decimal division problems.

ACCESS

Overestimate or Underestimate? Look at the student work below. Without doing the calculation, determine whether each student's estimate is an overestimate or underestimate of the exact answer. Be prepared to share your reasoning.

1.

Problem		Estimate
5,329	→	5,500
+ 7,899		+ 8,000
		13,500

overestimate or underestimate

2.

Problem		Estimate
329		300
X 14		X 10
		3,000

overestimate or underestimate

3.

Problem	Estimate
3,915 ÷ 436 =	4,000 ÷ 400 = 10

overestimate or underestimate

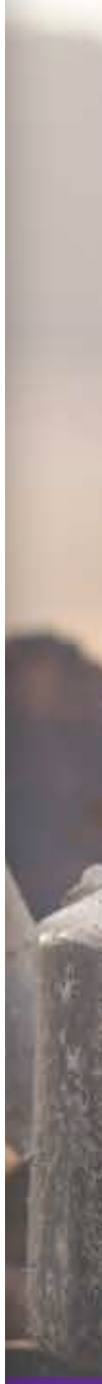


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BUILD

Estimating Decimal Quotients Estimate the quotient for each expression by rounding the divisor and dividend to the nearest compatible whole numbers.

1. $45.64 \div 6.87$ My Estimate: _____

2. $4.98\overline{)22.12}$ My Estimate: _____

3. $3.25\overline{)10.17}$ My Estimate: _____

4. $45.35 \div 5.3$ My Estimate: _____

5. $18.52\overline{)62.31}$ My Estimate: _____

6. $21\overline{)492.7}$ My Estimate: _____

Planning for a New Building Emad, an electrician, is the project manager for an upcoming construction project. He needs your help finding estimates for various projects on site. Read through each problem and estimate the answer.



Building Construction

1. A team of workers excavates 15.84 cubic meters (m^3) of dirt each hour. How long will it take them to excavate 78.1 m^3 of dirt?

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2. The frame of the building will be made of 25.3 metric tons (t) of concrete and 52.8 t of steel. What is the total mass of the frame of the building?

3. Each floor of the building needs 28.3 meters of plastic piping. The team has a total of 314.58 m of piping. How many floors can they fit with the piping?

4. Each steel joist can support 224.6 kilograms of weight. How much weight can 10 steel joists support?

5. The team has a total of 668.7 meters of electrical wiring for the building they are constructing. If each floor receives the same amount of wiring, how much wiring can they put on each of the 9 floors?

6. The building code requires there to be a window every 4.3 meters apart. If the front of the building is 38.9 m long, how many windows will there be?

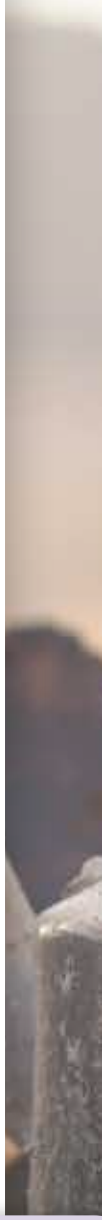


Photo Credit: Shutterstock.com

CONNECT

Writing About Math Describe in your own words what you have learned about decimal multiplication and division so far. What questions do you still have? You may use words, numbers, and pictures to explain your thinking.

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 15

Dividing Decimals by Whole Numbers

Quick Code
egm5122

Learning Targets

- I can use the standard algorithm to divide decimals through the Thousandths place.
- I can use estimation to check the reasonableness of my answer.

ACCESS

What Does the Remainder Mean? Use the standard algorithm for division to find the quotients.

1. Reda works as a plumber. He has 150 meters of copper pipe that he needs to cut into 40 equal-sized smaller pipes. How long will each pipe be? How much pipe will be leftover?
2. The city council is beautifying the city by planting trees along the roadside. The road is 2,050 meters long and the council has 75 trees which they are spacing an equal distance apart. What is the distance between each tree?

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BUILD

Getting Rid of Remainders Use the standard algorithm to find the quotients. Make sure that your answer does not include a remainder. Check your answer for reasonableness.

1. Reda works as a plumber. He has 150 meters of copper pipe that he needs to cut into 40 equal-sized smaller pipes. How long will each pipe be?
2. The city council is beautifying the city by planting trees along the roadside. The road is 2,050 meters long and the council has 75 trees which they are spacing an equal distance apart. What is the distance between each tree?
3. Emad, the electrician, has 4.5 meters of wire that is cut into 30 pieces that are all the same length. Find the length of each piece of wire.

4. $9\overline{)121.1}$

6. $16\overline{)62.24}$

8. $30\overline{)589.5}$

5. $5\overline{)51.65}$

7. $6\overline{)73.02}$

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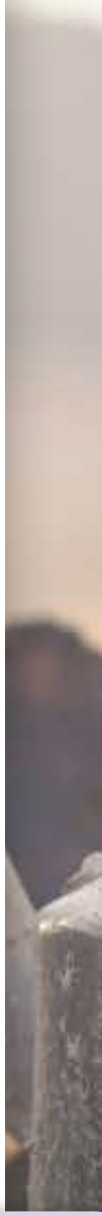
CONNECT

No Hibiscus Left Over Read the problem carefully. Then, use the standard algorithm for division to find the quotients.

Dalia wants to pour 20 liters of hibiscus equally into 50 cups. How much hibiscus (in liters) will be in each cup?



Hibiscus Leaves



Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 16

Dividing Decimals by Decimals

Quick Code
egm5124

Learning Targets

- I can use the standard algorithm to divide decimals through the Thousandths place.
- I can use estimation to check the reasonableness of my answers.

ACCESS

Missing Numbers Complete each equation by choosing from the given values. Choices may be used more than one time or not at all.

3	10	12	30	100	120	300	1,200

1. $15 \div _____ = 5$
2. $150 \div _____ = 5$
3. $1{,}500 \div _____ = 5$
4. $144 \div _____ = 12$
5. $1{,}440 \div _____ = 12$
6. $14{,}400 \div _____ = 12$
7. $0.3 \times _____ = 3$
8. $0.14 \times _____ = 14$
9. $6.09 \times _____ = 609$
10. $157.4 \times _____ = 1{,}574$
11. $0.07 \times _____ = 7$
12. $4.9 \times _____ = 49$

Photo Credit: Shutterstock.com

BUILD

Make It a Whole Number Work with your teacher to complete each division problem. Estimate the quotients. Then, use the standard algorithm for division to find the quotient. Use your estimates to check the reasonableness of your answers.

1. $2.2\overline{)26.4}$ Estimate: _____

Quotient: _____

2. $0.4\overline{)99}$ Estimate: _____

Quotient: _____

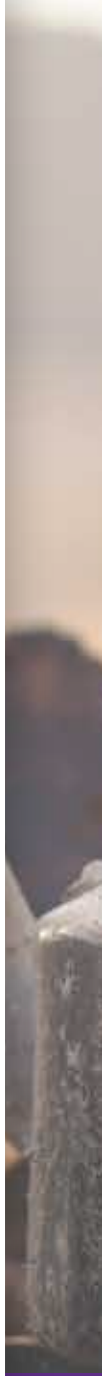
3. $0.04\overline{)1.5}$ Estimate: _____

Quotient: _____

Let's Try It Together Work with your partner to estimate the quotients. Then, use the standard algorithm for division to find the quotients. Stop dividing at the Thousandths place. Use your estimates to check the reasonableness of your answers.

1. $1.9\overline{)9.956}$ Estimate: _____ Quotient: _____	**4.** $0.05\overline{)1.43}$ Estimate: _____ Quotient: _____
2. $7.3\overline{)3.431}$ Estimate: _____ Quotient: _____	**5.** $0.5\overline{)44}$ Estimate: _____ Quotient: _____
3. $0.04\overline{)0.51}$ Estimate: _____ Quotient: _____	**6.** $0.7\overline{)70}$ Estimate: _____ Quotient: _____

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7. $0.03\overline{)90}$ Estimate: _____ Quotient: _____	**9.** $0.5\overline{)0.91}$ Estimate: _____ Quotient: _____
8. $0.04\overline{)57.6}$ Estimate: _____ Quotient: _____	**10.** $0.5\overline{)1.3}$ Estimate: _____ Quotient: _____

CONNECT

Error Analysis Evaluate the student's work below. Explain the error (or errors) the student made. Then, perform the division correctly to find the quotient.

Divide: $0.3\overline{)77.43}$

Student's work: $77.43 \div 0.3$ will have the same quotient as $7.743 \div 3$.

$$
\begin{array}{r}
2.581 \\
3\overline{)7.743} \\
\underline{6} \\
17 \\
\underline{15} \\
24 \\
\underline{24} \\
3 \\
\underline{3}
\end{array}
$$

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Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 17

Solving Challenging Multistep Story Problems

Quick Code
egm5126

Learning Target

- I can solve multistep story problems involving addition, subtraction, multiplication, and division of decimals.

ACCESS

Telling My Story Write a story problem that can be modeled by the expression 342 ÷ 0.01. Include the use of measurement in your problem. Then, find the quotient, including the units of measure.

BUILD

Solving Multistep Problems Read each problem carefully. Identify what is known and what is unknown. How would you use that information to solve each problem? Label all answers, using a unit of measure when appropriate.

1. Abdallah buys the sturdiest boxes for the produce at his market. He wonders what the mass of the box is in kilograms. The total mass of a box and 3 identical pomegranates is 1.03 kg. When the identical pomegranates in the box are tripled, the total mass is 2.29 kg. What is the mass of one of Abdallah's empty boxes? _____

2. Samira is training for her weightlifting competition. She attaches 4 weights to her bar—a pair of larger weights and a pair of smaller weights. One of the larger weights is 12.4 kilograms heavier than one of the smaller weights. Together the four weights have a mass of 100 kg. What is the total mass of the pair of larger weights? _____

3. Basem is having a sale at his sweets shop. One chocolate candy is 1.95 LE. He will provide 2 free candies for every 10 bought. A customer wants to buy 100 candies for an event. How much will the customer spend? _____

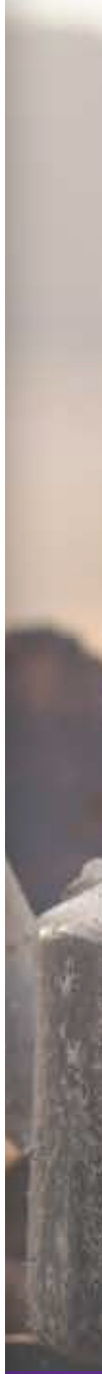


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Partner Problem Solving Work with your partner to solve your assigned problem. Then, collaborate to make a poster illustrating your problem-solving process.

1. As part of her fitness training, Samira cycles 42.12 kilometers in 2 hours.

If she cycles at the same rate the entire time, how far will she travel in 1 hour? Give your answer in km and meters using whole numbers.

_____ km and _____ m

2. Magdy is filling identical vases with water for flower arrangements at the florist. He pours 18 liters and 250 milliliters equally into 24 vases. When he is finished, Magdy still has 0.85 L of water left.

How much water is in each vase? Give your answer in liters. _____

3. Omar had 30 kilograms of planting soil for his garden. He used 2.8 kg in each of his 5 large planters. He used 0.4 kg to fill each of his remaining pots.

Find the maximum number of pots Omar can fill with his planting soil. Label your answer.

Photo Credit: Shutterstock.com

4. The mass of a package of cake is 0.08 kilograms heavier than the mass of a package of cookies. The mass of 6 packages of cake is the same as the mass of 9 packages of cookies. Label your answers.

What is the mass of a single package of cookies? _____

What is the mass of a single package of cake? _____



Cake and Cookies

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CONNECT

Writing About Math Reflect on your problem-solving process. Write a note to yourself about things to remember when solving multistep problems.

Check Your Understanding

Follow your teacher's instructions to complete this activity.

UNIT

6

Theme 2 | Mathematical Operations and Algebraic Thinking

Unit 6 Numerical Expressions and Patterns

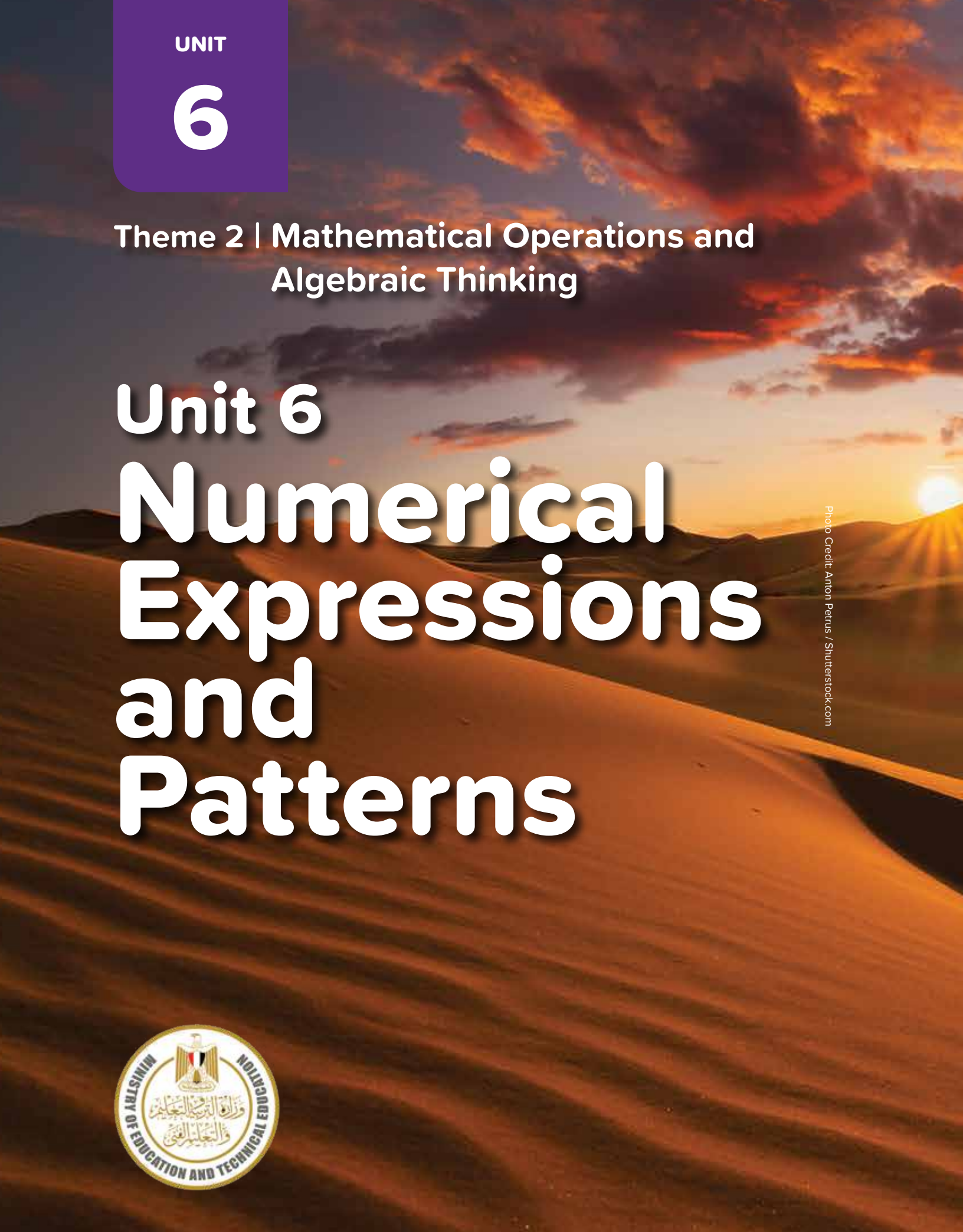


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MINISTRY OF EDUCATION AND TECHNICAL EDUCATION



Calculating Meals

Unit Video Questions

Quick Code
egm5129

The Unit 6 Opener Video, Calculating Meals, explores math around Egypt through numerical expressions and patterns. In this unit, you will learn to apply the order of operations to evaluate numerical expressions. You will use expressions to identify and extend numerical patterns.

- [] How did the students use numerical expressions to make sense of the world around them?
- [] What did the students discover about numerical expressions?

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CONCEPT
1

Evaluating Numerical Expressions

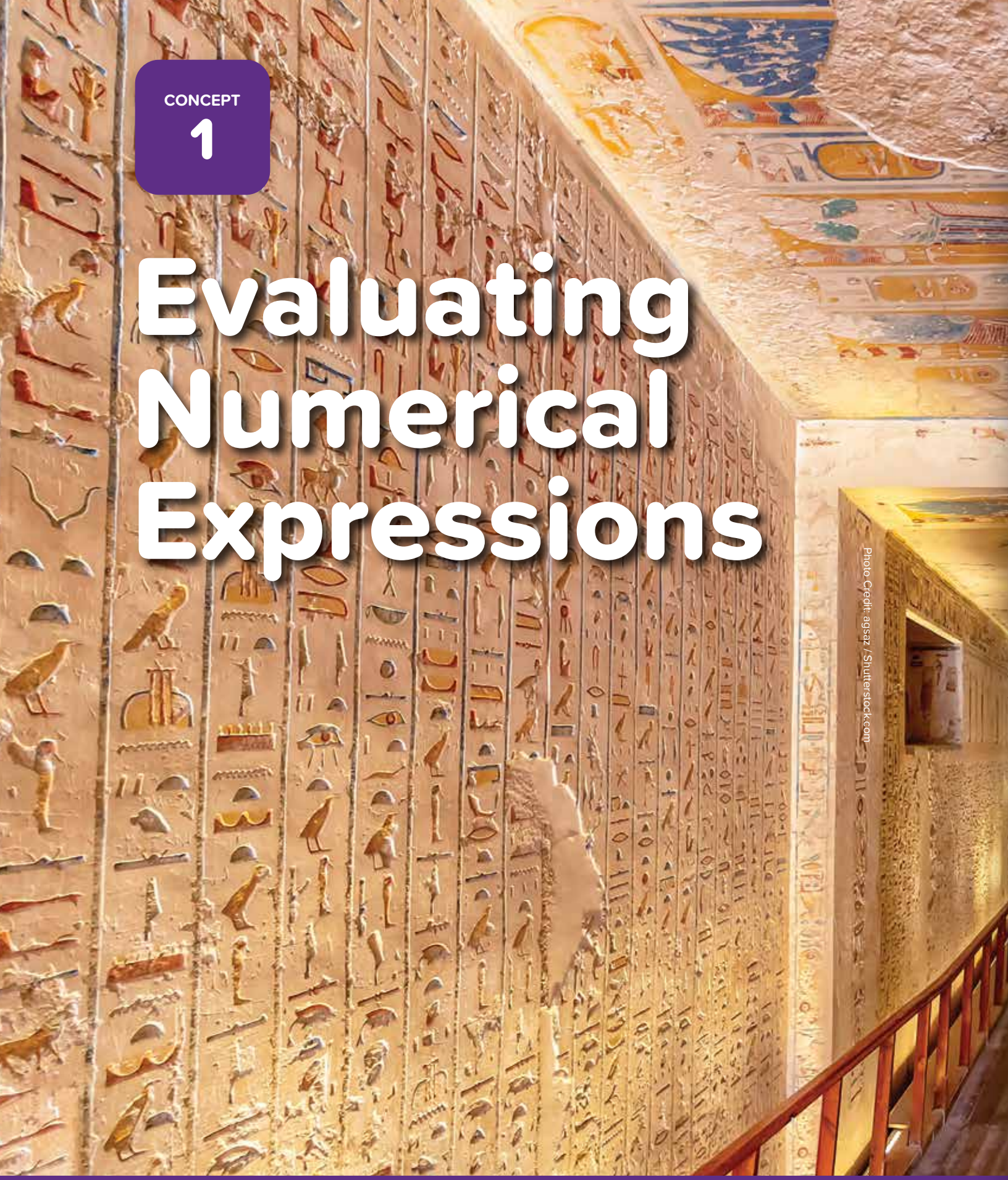


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LESSON 1

Numerical Expressions

Quick Code egm5131

Learning Target

- I can use the **order of operations** to evaluate expressions with whole numbers and decimals.

ACCESS

Fill in the Blank Record the missing value to complete each equation.

1. 45.9 – _____ = 32.57
2. _____ ÷ 9.2 = 4.8
3. 105.7 + _____ = 213.2
4. 202.83 – 40.2 × 2 – 0.33 ÷ 0.01 + 67.05 = _____

BUILD

Order Matters Use the order of operations to evaluate each expression.

Basic Order of Operations

1. Multiply or divide from left to right.
2. Add or subtract from left to right.

1. 82.43 × 3.1 + 4.05 ÷ 0.01 – 2.5
2. 56.5 × 2.3 – 15 + 12.7
3. 597.8 ÷ 6.1 + 13 × 1.7
4. 90.7 + 116.6 × 0.1 × 2 – 20
5. 1,403.5 – 12.3 ÷ 0.01 + 9.8

One Step at a Time Evaluate each expression, one step at a time, with your class or group. Be sure to rewrite the expression after each step.

1. 145.42 – 7.11 × 10 + 13.2
2. 35 × 0.1 + 89.14 ÷ 0.1
3. 102.15 + 6 ÷ 1.2 – 34 × 2.3

Photo Credit: agsaz / Shutterstock.com

CONNECT

The Right Route Ali drives a bus route through the city. His stops follow the order of operations for evaluating the expression.

$$300.53 - 11.04 \times 0.2 \div 0.01 + 13.07$$

STOP 1	STOP 2	STOP 3	STOP 4
A. $300.53 - 11.04$	E. $2.208 \div 0.01$	J. $57.898 \div 0.01$	N. $5,789.8 + 13.07$
B. 11.04×0.2	F. $0.2 \div 13.08$	K. $220.8 + 13.07$	P. $79.73 + 13.07$
C. $0.2 \div 0.01$	G. 289.49×0.2	L. 289.49×20	Q. $300.53 - 233.87$
D. $0.01 + 13.07$	H. 11.04×20	M. $300.53 - 220.8$	R. $57.898 + 13.07$

Record the letters of the correct stops along his route to show the steps for evaluating the expression.

1. Stop 1: _____
2. Stop 2: _____
3. Stop 3: _____
4. Stop 4: _____



Tour Bus

Photo Credit: (a) agsaz / Shutterstock.com, (b) Good Luck Express / Shutterstock.com

Check Your Understanding

Follow your teacher's instructions to complete this activity.



LESSON 2

Numerical Expressions with Grouping Symbols

Quick Code
egm5133

Learning Targets

- I can identify how grouping symbols affect the order of operations.
- I can evaluate an expression with grouping symbols.

ACCESS

Make It Smaller Work with a partner to describe how you could apply operations to the expressions so that they evaluate to the least possible value. You do not have to follow the standard order of operations.

1. $10 \times 4 - 3$

2. $15 \div 3 + 2$

3. $12 + 24 \div 4 + 8$

4. $34 \times 28 \div 2 + 5$

BUILD

Grouping Symbols Evaluate the set of expressions. Pay attention to the grouping symbols and how they change the order in which the operations are performed.

Expanded Order of Operations

1. For operations within parentheses
 a. multiply or divide from left to right
 b. add or subtract from left to right
2. For operations outside parentheses
 a. multiply or divide from left to right
 b. add or subtract from left to right

Photo Credit: agsaz / Shutterstock.com

Set A

1. $45.84 + 13.05 \div 5 + 20.32 - 1.14 \times 2.1$

2. $(45.84 + 13.05) \div 5 + 20.32 - 1.14 \times 2.1$

3. $45.84 + 13.05 \div 5 + 20.32 - (1.14 \times 2.1)$

4. $45.84 + 13.05 \div 5 + (20.32 - 1.14) \times 2.1$

5. $45.84 + (13.05 \div 5 + 20.32 - 1.14) \times 2.1$

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Grouping Symbols, Advanced Evaluate the set of expressions. Pay attention to the grouping symbols and how they change the order in which the operations are performed.

Advanced Order of Operations

1. For operations within parentheses
 a. multiply or divide from left to right
 b. add or subtract from left to right



2. For operations within brackets
 a. multiply or divide from left to right
 b. add or subtract from left to right
3. For operations outside of parentheses or brackets
 a. multiply or divide from left to right
 b. add or subtract from left to right

Set B

1. $30 \times 2.5 + 47.18 - 3.12 \div 0.1$

2. $30 \times (2.5 + 47.18 - 3.12 \div 0.1)$

3. $30 \times \left[2.5 + (47.18 - 3.12) \div 0.1\right]$

4. $(30 \times 2.5 + 47.18 - 3.12) \div 0.1$

5. $\left[30 \times (2.5 + 47.18 - 3.12)\right] \div 0.1$

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How Many Values? Use grouping symbols to create as many expressions with different values as you can.

1. $29.2 + 43 \times 0.01 + 15 \div 0.1$

2. $158 \div 2 + 6 \times 10.5 - 5$

3. $57 - 11 \times 1.2 + 3.4 + 1.9 \div 10$

Photo Credit: agsaz / Shutterstock.com

CONNECT

Place the Grouping Symbols Kamal placed grouping symbols in the expression. When he evaluated the expression, he found a value of 6.45.

What grouping symbols did he use? Where did he place them?

$15.25 \div 2 + 3 + 6.8 \div 2$

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 3

Placing Grouping Symbols

Quick Code
egm5187

Learning Targets

- I can evaluate expressions with grouping symbols.
- I can place grouping symbols in expressions to generate given values.

ACCESS

Hidden Symbols Work with your teacher to evaluate expressions with and without grouping symbols.

BUILD

Placing Grouping Symbols to Generate Values Place grouping symbols (parentheses and/or brackets) in the expressions to generate the given values. Be sure to evaluate the expression completely to make sure you are correct. (Hint: Sometimes grouping symbols are not needed.)

1. The value is 9. $6 - 5 \times 7 + 2$

2. The value is 27. $9 \times 4 + 5 \div 3$

3. The value is 13. $2 \times 18 \div 9 + 9$

4. The value is 11. $88 \div 11 - 7 + 4$

5. The value is 59.85. $3.8 \times 9.5 + 6.25$

6. The value is 42.35. $3.8 \times 9.5 + 6.25$

7. The value is 346.8 $20 + 33.29 \times 10 - 6.1$

Photo Credit: agsaz / Shutterstock.com

8. The value is 526.8. $20 + 33.29 \times 10 - 6.1$

9. The value is 3,288. $20 + 33.29 \times 10 - 6.1 \times 10$

10. The value is 1,498.31. $20 + 33.29 \times 10 - 6.1 \times 10$

Challenge Write your own expression with grouping symbols and evaluate. Make sure that the grouping symbols are necessary. Rewrite the expression without grouping symbols and ask your partner to place grouping symbols to generate your value.

CONNECT

Writing About Math Reflect on the order of operations. Then, explain why it is possible for grouping symbols to change the value of an expression. Give an example to support your thinking.

Photo Credit: agsaz / Shutterstock.com

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 4

Writing Expressions to Represent Scenarios

Quick Code
egm5135

Learning Target

- I can write an expression to represent a written scenario.

ACCESS

With or Without Evaluate each set of expressions. Think about how and when the parentheses change the value of the expression.

1. $1.3 + 3.45 \times 8 - 2.02$

 $(1.3 + 3.45) \times 8 - 2.02$

2. $350 + 450.9 \div 2 + 23.7$

 $350 + (450.9 \div 2) + 23.7$

3. $64 \div 0.32 + 0.1 \times 3.2$

 $64 \div (0.32 + 0.1 \times 3.2)$

4. $50.6 \times 12 - 6.8 \div 0.2$

 $(50.6 \times 12) - 6.8 \div 0.2$

BUILD

Writing Expressions For each problem, work with a partner to write an expression that matches the clues. Then, evaluate the expression.

1. Subtract 3.1 from 4.62. Then, multiply the result by 2.

2. Divide 93 by 0.3 and then add 114.7. After, divide the result by 5.

3. Add 30.4, 87, and 17.5. Then, subtract the result from 224.7. Multiply by 100.

Photo Credit: agsaz / Shutterstock.com

4. Multiply 7.6 by 100. Next, subtract 34.3. Then, add 12.4. Last, divide the result by 0.1.

5. Find the difference between 10 and 9.27. Multiply by the sum of 54 and 46. Then, divide 1,168 by the result.

Expressions and Story Problems For each problem, write an expression that matches the scenario. Then, evaluate the expression.

1. Kamel is saving money to buy a car. He currently has 1,000 LE. He begins working two jobs. At his first job, he saves 50 LE a week. At his second job, he saves 30 LE a week. He saves the money from his jobs for 4 weeks to add to his savings. How much does Kamel have saved at the end of the 4 weeks?

2. Mounir is lifting weights to help train for an upcoming competition. He attaches 4 weights to his bar—a pair of larger weights and a pair of smaller weights. Each large weight has a mass of 33.75 kilograms and is 17.5 kg heavier than each of the smaller weights. Together the four weights have a mass of 100 kg. What is the mass of one of the smaller weights?

3. As part of his fitness training, Mounir cycles 38.7 kilometers in 2 hours. If he cycles at the same rate the entire time, how many meters does he cycle per minute?

Photo Credit: agsaz / Shutterstock.com

4. Hoda is filling identical vases with water for flower arrangements at the florist. She starts with 15.75 liters and pours an equal amount into 16 vases. When she is finished, Hoda still has 3.75 L of water left. How much water is in each vase? Give your answer in liters.



Florist

Photo Credit: (a) agsaz / Shutterstock.com, (b) photravelerYUUKI / Shutterstock.com

CONNECT

Writing About Math Reflect on how the order of operations is used to represent real-world situations.

Check Your Understanding

Follow your teacher's instructions to complete this activity.

CONCEPT
2

Analyzing Numerical Patterns

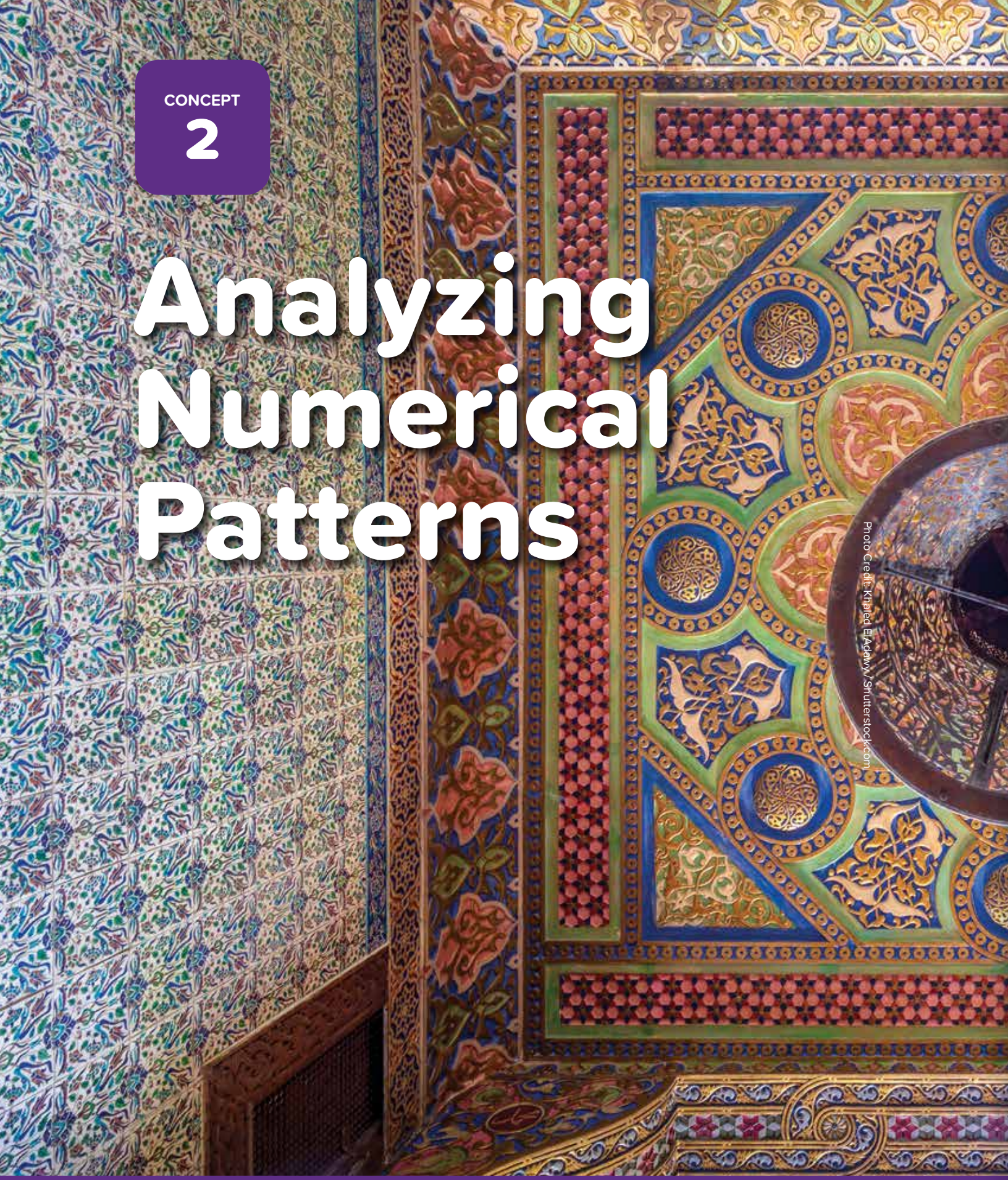


Photo Credit: Khaled ElAdawy / Shutterstock.com

LESSON 5

Identifying Numerical Patterns

Quick Code
egm5138

Learning Targets

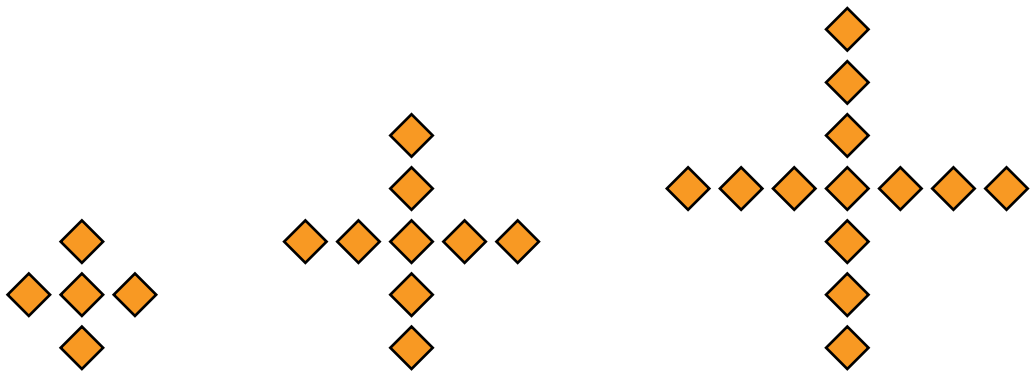
- I can identify a **numerical pattern**.
- I can explain the **rule** for a numerical pattern.
- I can use letters to represent unknown quantities in a rule for a numerical pattern.

ACCESS

Tile Pattern Yaseen is laying floor tiles in the pattern shown. Each picture represents one stage of the pattern, and the pattern grows consistently between stages. Answer the questions about the pattern.

Photo Credit: Khaled ElAdawy / Shutterstock.com

Stage 1 **Stage 2** **Stage 3**



Draw Stage 4 and Stage 5. How many tiles do you think will be in Stage 10? Explain how you came up with your answer.

BUILD

Numerical Patterns Look at each set of numbers and identify whether the numbers form a pattern. If yes, then identify the rule.

	Set	Pattern? (Y / N)	Rule
1.	5, 10, 20, 40, 80 . . .		
2.	3, 6, 9, 15, 21, 28 . . .		
3.	1.5, 3, 4.5, 6, 7.5 . . .		
4.	5, 3, 6, 1, 7, 5 . . .		
5.	1, 3, 9, 18, 54 . . .		
6.	85, 73, 61, 49, 37 . . .		

What's the Rule? Look at each table and determine the rule. Use a variable to write the rule.

1.

Input	Output
1	8
2	16
3	24
4	32
5	40

Rule: _____

2.

Input	Output
1	8
2	9
3	10
4	11

Rule: _____

Photo Credit: Khaled El Adawy / Shutterstock.com

3.

Input	Output
3	12
6	24
9	36
12	48

Rule: _____

4.

Input	Output
5	1
10	2
15	3
20	4
25	5

Rule: _____

5.

Number of Bicycles (Input)	Number of Wheels (Output)
1	2
2	4
3	6
4	8
5	10

Rule: _____

Challenge:

Input	Output
2	3
4	7
6	11
8	15
10	19

Rule: _____



Bicycle Wheels

Photo Credit: (a) Khaled ElAdawy / Shutterstock.com, (b) Cristi Lucaci / Shutterstock.com

CONNECT

Writing About Math Look at the pattern and the two students' work. Then, respond to the prompt.

Write a rule using a variable and explain your thinking.

Input	Output
28	4
35	5
42	6
49	7
56	8

Yahia's Work

Rule: $n \times 7$

I think the rule is multiply by 7 because $4 \times 7 = 28$ and $5 \times 7 = 35$ and it works for each pair.

Walid's Work

Rule: $n \div 7$

I think the rule is divide by 7 because $28 \div 7 = 4$ and $35 \div 7 = 5$ and it works for each pair.

Which student is correct? Explain how you know your answer is correct.

Photo Credit: Khaled El Adawy / Shutterstock.com

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 6

Extending and Creating Numerical Patterns

Quick Code
egm5140

Learning Targets

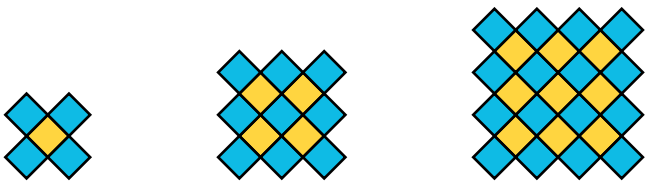
- I can extend a numerical pattern.
- I can create a numerical pattern.
- I can create two numerical patterns using two given rules.

ACCESS

Tile Pattern Abeer is laying floor tiles in the pattern shown. Each picture represents one stage of the pattern. The pattern grows consistently between stages.

Answer the questions about the pattern.

Stage 1 **Stage 2** **Stage 3**



1. How many blue tiles will be in Stage 4? How many yellow tiles will be in Stage 4?

 Blue: _____ **Yellow:** _____

2. How many blue tiles will be in Stage 5? How many yellow tiles will be in Stage 5?

 Blue: _____ **Yellow:** _____

3. How many blue tiles will be in Stage 10? How many yellow tiles will be in Stage 10?

 Blue: _____ **Yellow:** _____

Photo Credit: Khaled ElAdawy / Shutterstock.com

BUILD

Extending the Tile Pattern Fill in the missing values. Use the rule for the tile pattern in ACCESS.

Number of Blue Tiles (Input)	Number of Yellow Tiles (Output)
144	A. _____
225	B. _____
C. _____	324
400	D. _____

Extending Other Patterns Write the rule for each pattern with a variable. Then, complete the pattern by finding the missing values.

1. 52, 44, 36, 28, 20, _____, _____ **Rule:** _____

2. 23, 27, _____, 35, 39, _____, _____ **Rule:** _____

3.

Input	Output
5	20
6	A. _____
7	28
B. _____	32
9	36

Rule: _____

Photo Credit: Khaled El Adawy / Shutterstock.com



4.

Input	Output
10	6
12	7
A. _____	8
16	9

Rule: _____

5.

Input	Output
31	10
39	18
A. _____	27
56	35
72	B. _____

Rule: _____

Creating Patterns Using the information given, list the first five numbers in the pattern.

1. **Starting number:** 1

Rule: $n + 3$

_____, _____, _____, _____, _____

2. **Starting number:** 3

Rule: $n \times 2 - 1.5$

_____, _____, _____, _____, _____

3. **Starting number:** 5.25

Rule: $n \div 0.5$

_____, _____, _____, _____, _____

Photo Credit: Khaled ElAdawy / Shutterstock.com

4. **Starting number:** 11

 Rule: $(n + 3) \times 10$

 _____, _____, _____, _____, _____

5. Select your own starting number and rule. Write the first five numbers in your pattern.

 Starting number:

 Rule:

 _____, _____, _____, _____, _____

CONNECT

Writing About Math When might it be helpful to identify and extend numerical patterns? Use words and numbers to explain your thinking.



Bricklayer

Photo Credit: (a) Khaled ElAdawy / Shutterstock.com, (b) Aisyaqilumaranas / Shutterstock.com

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 7

Solving Problems with Numerical Patterns

Quick Code
egm5142

Learning Target

- I can solve real-world problems involving numerical patterns.

ACCESS

What's the Rule? Explore the pattern. How can you extend the pattern? (Think: How are the numbers changing? Is the change the same every time?)

0, 1, 1, 2, 3, 5, 8, 13, 21, 34, _____, _____

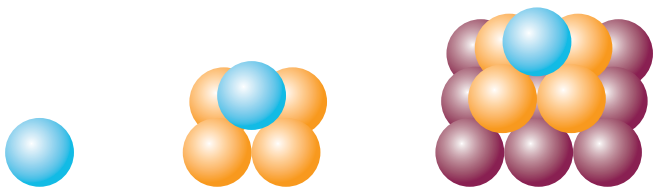
Photo Credit: Khaled ElAdawy / Shutterstock.com

BUILD

Pyramid Pattern Each picture represents one stage of the pattern, and the pattern grows consistently between stages.

Complete the table.

Stage 1 **Stage 2** **Stage 3**



Stage	Number of Balls
1	1
2	5
3	14
4	A. _____
5	B. _____

Patterns in the Real World Use a pattern to help you solve each problem.

1. When Shams was 6 years old, her brother Tamer was half her age. How old will Tamer be when Shams is 12? _____

2. Complete the table to show Shams' and Tamer's ages.

Shams' Age	Tamer's Age
15	A. _____
17	B. _____
C. _____	16
22	D. _____
E. _____	21

3. A seamstress is making dresses. She noticed the amount of fabric she used to make 3 dresses and to make 5 dresses. Use the pattern to complete the table.

Number of Dresses	Fabric Needed (m)
1	A. _____
2	B. _____
3	7.5
4	C. _____
5	12.5

4. How much fabric will the seamstress need to make 7 dresses? _____

 How many dresses can the seamstress make with 42.5 meters of fabric?

Photo Credit: Khaled El Adawy / Shutterstock.com

5. The local library charges a fine on the first day a book is overdue. It charges another amount for each additional day it is overdue. The table shows the amount charged for a book that is overdue.

Fines for Overdue Library Books

Days Overdue	Fine in LE
2	5
4	11
6	17

What is the amount charged for each additional day? _____

Following that rule, what is the amount charged on the first day?

6. Write a rule with a variable for how much the library charges where n is the number of days the book is overdue. Remember to include the amount charged on the first day in your rule.



Library Books

Photo Credit: (a) Khaled ElAdawy / Shutterstock.com, (b) jakkaje879 / Shutterstock.com

CONNECT

Writing About Math Where do you see patterns in your life? Describe how those patterns change.

Check Your Understanding

Follow your teacher's instructions to complete this activity.

Primary 5 Resources

- Glossary
- Index

A

acute
An angle measuring less than 90°.

addend
Any number being added. In the equation 6 + 8 = 14, 6 and 8 are both addends, 14 is the sum.

algorithm
A step-by-step method for computing.

angle
Two rays that share an endpoint.

area
The measure, in square units, of the inside of a plane figure.

area model
A model of multiplication that shows each place value product.

Associative Property of Multiplication
States that changing the grouping of three or more factors does not change the product.

attribute
A characteristic or property of an object, such as color, shape, size, and so on.

B

base
Any side of a plane figure. Usually thought of as a side where the figure "sits."

benchmark
A known size or amount that can be used as a reference to help understand a different size or amount. Benchmarks can be helpful in estimation and in checking the reasonableness of answers.

Glossary

benchmark fractions
Fractions that are commonly used for estimation. Benchmark fractions are useful when comparing and ordering. One-half, one-third, one-fourth, three-fourths, and two-thirds are all benchmark fractions.

brackets
Symbols used in pairs to group things together.

C

capacity
The amount of liquid a container can hold.

circle graph
A type of graph in which a circle is divided into sectors that each represent a proportion of the whole.

circular degrees
A circle is divided into 360 equal degrees.

common factor
Any factor that is shared by two or more numbers. Six is a common factor of both 12 and 24.

common multiple
Any multiple that is shared by two or more numbers. Six is a common multiple of both 2 and 3.

Commutative Property of Addition
States that changing the order of the addends does not change the sum.

Commutative Property of Multiplication
States that changing the order of the factors does not change the product.

compatible numbers
Numbers that are easy to compute mentally and are close in value to the actual numbers. Compatible numbers can be used when estimating.

compose
To put together smaller numbers to make larger numbers.

composite
A whole number that is not prime.

compound shape
Any shape that is made up of two or more geometric shapes.

cone
A solid object that has a circular base joined to a point by a curved side.

congruent
Having exactly the same size and shape.

coordinate
A set of values that show an exact position.

coordinate plane
A two-dimensional system in which a location is described by its distances from two perpendicular reference lines (axes). Also called a coordinate grid.

cube
A box-shaped solid object that has six identical square faces.

cubic units
A number, multiplied by itself and then multiplied again by itself.

cylinder
A solid object with two identical flat ends that are circular or elliptical and one curved side.

D

decompose
To separate a number into two or more parts.

denominator
The quantity below the line in a fraction. It tells how many equal parts are in the whole.

difference
The amount that remains after one quantity is subtracted from another. The answer in a subtraction problem.

Glossary

digit
Any of the symbols 0, 1, 2, 3, 4, 5, 6, 7, 8, or 9. (Also known as Base 10 numerals.)

dimension
A measurement of length in one direction.

Distributive Property of Multiplication
States that whether the numbers in parentheses are added before or after multiplication, the results are the same.

dividend
A number that is divided by another number. Fifty-six is the dividend in $56 \div 8 = 7$.

division
Splitting into equal parts or groups also known as fair sharing.

divisor
The number by which another number is divided. Eight is the divisor in $56 \div 8 = 7$.

E

edge
A line segment on the boundary joining one vertex to another.

equation
A mathematical sentence with an equal sign. The amount on one side of the equal sign has the same value as the amount on the other side. $4 + 3 = 7$

equilateral
Having all sides of equal length.

equivalent
Having the same value.

estimate
To find a number close to an exact amount; an estimate tells about how much or about how many.

expanded form
A way to write numbers that shows the place value of each digit. $263 = 200 + 60 + 3$

exponent
A symbol written above and to the right of a mathematical expression to indicate the operation of raising to a power.

expression
A mathematical phrase without an equal sign. $n + 4$

F

face
Any of the individual flat surfaces of a solid object.

factor
Numbers we can multiply together to get another number.

factor pair
Two numbers that multiply together to reach a certain product.

factor tree
A diagram that shows all the factors of a number, with the number appearing at the top of the "tree" and factors of that number appearing in "branches" until each branch ends in prime number.

finite
Not infinite. Has an end.

formula
A rule that is written as an equation. $A = l \times w$

fraction
A way to describe a part of a whole or a part of a group by using equal parts.

frequency
The number of times an event or a value occurs.

G

greatest common factor (GCF)
The greatest number that is a factor of two (or more) other numbers.

H

hierarchy
A way of ranking and organizing things or people.

Hundredths
In the decimal numeration system, Hundredths is the name of the next place to the right of Tenths.

I

Identity Property of Multiplication
States that the product of any number and 1 is that number: $n \times 1 = n$.

improper fraction
A fraction in which the numerator is larger than or equal to the denominator.

infinite
Without an end. Not finite.

input
The known variable you feed into the expression.

intersect
A single point where two lines meet or cross each other.

intersecting
Two or more lines cross each other in a plane, sharing a common point.

inverse operation
Opposite operations. They are the operation that reverses the effect of another operation.

irregular polygon
A polygon that does not have all sides equal and all angles equal.

isosceles
A triangle having two sides equal in length.

L

layers
Horizontal segments of a three-dimensional figure; used for calculating the volume of the figure by decomposing it.

least common multiple (LCM)
The smallest positive number that is a multiple of two or more numbers.

like denominators
Denominators in two or more fractions that are the same.

line graph
A type of chart used to show information that changes over time.

M

midpoint strategy
A method in which students use the midpoint of a number line to help visualize rounding numbers.

Milliard
One thousand million.

minuend
A number from which another is to be subtracted.

mixed number
A number that has a whole number and a fraction.

multiple
A product of a given whole number and any other whole number. Twelve is a multiple of 3 and 4 because $3 \times 4 = 12$.

multiples
Numbers created by multiplying two factors.

multiplication
The method of finding the product of two or more numbers; repeated addition.

multiplicative comparison
A way to compare quantities using multiplication, as in "This tree is three times shorter than that tree."

N

nets
Patterns that can be cut and folded to make a model of a solid shape.

numerator
The number written above the line in a fraction. It tells how many equal parts are described in the fraction.

numerical pattern
A list of numbers that follow a certain sequence or pattern.

O

obtuse
An angle measuring greater than 90°.

order of operations
A set of rules that tells the order in which to compute.

1. For operations within parentheses
 a. multiply or divide from left to right
 b. add or subtract from left to right
2. For operations within brackets
 a. multiply or divide from left to right
 b. add or subtract from left to right
3. For operations outside parentheses
 a. multiply or divide from left to right
 b. add or subtract from left to right

ordered pair
A pair of numbers used to locate a point on a coordinate plane; the pair is written in the form (*x*-coordinate, *y*-coordinate); *x*-coordinate is the perpendicular distance of the point from the *y*-axis; the *y*-coordinate is the perpendicular distance of the point from the *x*-axis.

origin
In a coordinate plane, the point at the intersection of the *x*- and *y*-axes; the point (0, 0).

output
What comes out of the function; the solution.

overestimate
An estimate that is greater than the actual answer to a problem.

P

parallel
Always the same distance apart and never touching.

parentheses
Grouping symbols for operations. When simplifying an expression, the operations within the parentheses are performed first.

partial products
Any of the multiplication results we get leading up to an overall multiplication result.

partial products model
A model that breaks numbers down into their factors or place values to make multiplication easier.

partial quotients model
A method of dividing in which multiples of the divisor are subtracted from the dividend, and then the partial quotients are added together.

pattern
A repeating or growing sequence or design.

Glossary

percentage
A number or ratio expressed as a fraction of 100.

perimeter
The distance around the outside of a figure.

perpendicular
Two lines intersecting each other at 90° or a right angle.

pie chart
A type of graph in which a circle is divided into sectors that each represent a proportion of the whole.

place value
The value of the place of a digit in a number.

powers of ten
A set of mathematical notations that allow you to express any number as a product of multiples of 10.

prime
A number greater than 1, with only two factors.

prime factorization
Finding which prime numbers multiply together to make the original number.

prime number
A whole number greater than 1 that has exactly two different factors, 1 and itself.

product
The answer to a multiplication problem. In $6 \times 7 = 42$, 42 is the product, or answer.

Q

quotient
The answer to a division problem.

R

ray
A part of a line that has one endpoint and goes on forever in one direction.

reasonable
Makes sense according to the numbers and operation used.

rectangular prism
A solid object that has six faces that are rectangles.

regroup
To rearrange numbers into groups of 10 when performing mathematical operations.

regrouping
The process of making groups of tens when adding or subtracting two-digit numbers (or more).

reliable
To be consistent in results.

remainder
The amount left over when one number is divided by another.

repeating decimal
A decimal in which after a certain point a particular digit or sequence of digits repeats itself indefinitely.

right angle
An angle that measures exactly 90°.

round
A way to change a number to a shorter or simpler number that is very close to the original number.

rule
Something that happens every time (for example: 2, 5, 8, 11 . . . the rule is +3).

S

sample size
A selection taken from a larger group (the "population") that provides information about the larger group.

scalene
A triangle having three sides unequal in length.

sequence
A set of numbers arranged in a special order or pattern.

Glossary

simplest form
When a fraction is expressed with the fewest possible pieces, it is in simplest form (also known as lowest terms and reduced).

simplify
To express a fraction in simplest form.

slices
Vertical segments of a three-dimensional figure; used for calculating the volume of the figure by decomposing it.

sphere
A three-dimensional object shaped like a ball.

square pyramid
A three-dimensional geometric shape that has a square base and four triangular bases that are joined at a vertex.

squared
A number multiplied by itself.

standard algorithm for multiplication
Strategy for multiplying by using partial products or multiplying in parts.

standard form
A common or usual way of writing a number using digits. 12,376 is in standard form.

subtrahend
A number to be subtracted from another.

sum
The answer to an addition problem.

survey size
The measure of the number of individual surveys used in an experiment.

symmetry
When two or more parts are identical after a flip, slide, or turn.

T

Tenths
In the decimal numeration, Tenths is the name of the place to the right of the decimal point.

terminating decimal
A decimal number that has digits that end.

Thousandths
The value of a digit that is the fourth position from the right when describing whole number place value.

Three Reads Strategy
A problem-solving strategy in which a story problem is read three times—once to understand what is happening in the problem, a second time to think about the numbers in the problem and what they might mean, and a third time to think about what question the problem could be asking.

tiling
Overlay of individual tiles that cover the plane without gaps or overlaps; strategy for calculating area.

U

underestimate
An estimate that is less than the actual answer to a problem.

unit fraction
A fraction that has 1 as its numerator. A unit fraction names 1 equal part of a whole.

unit squares
A unit square is a square whose sides have length 1.

unknown
Part of an expression or equation that has to be found; a variable that can be represented in a problem by a letter.

unlike denominators
Bottom numbers of two or more fractions that are not equal.

V

value
How much a digit is worth depending on where it is in a number; the result of a calculation.

variable
A letter or symbol that represents a number.
For example, in $5 \times b = 10$, b is a variable worth 2.

vertex
The point at which two line segments, lines, or rays meet to form an angle.

vertices
The point where the edges of a solid figure meet.

X

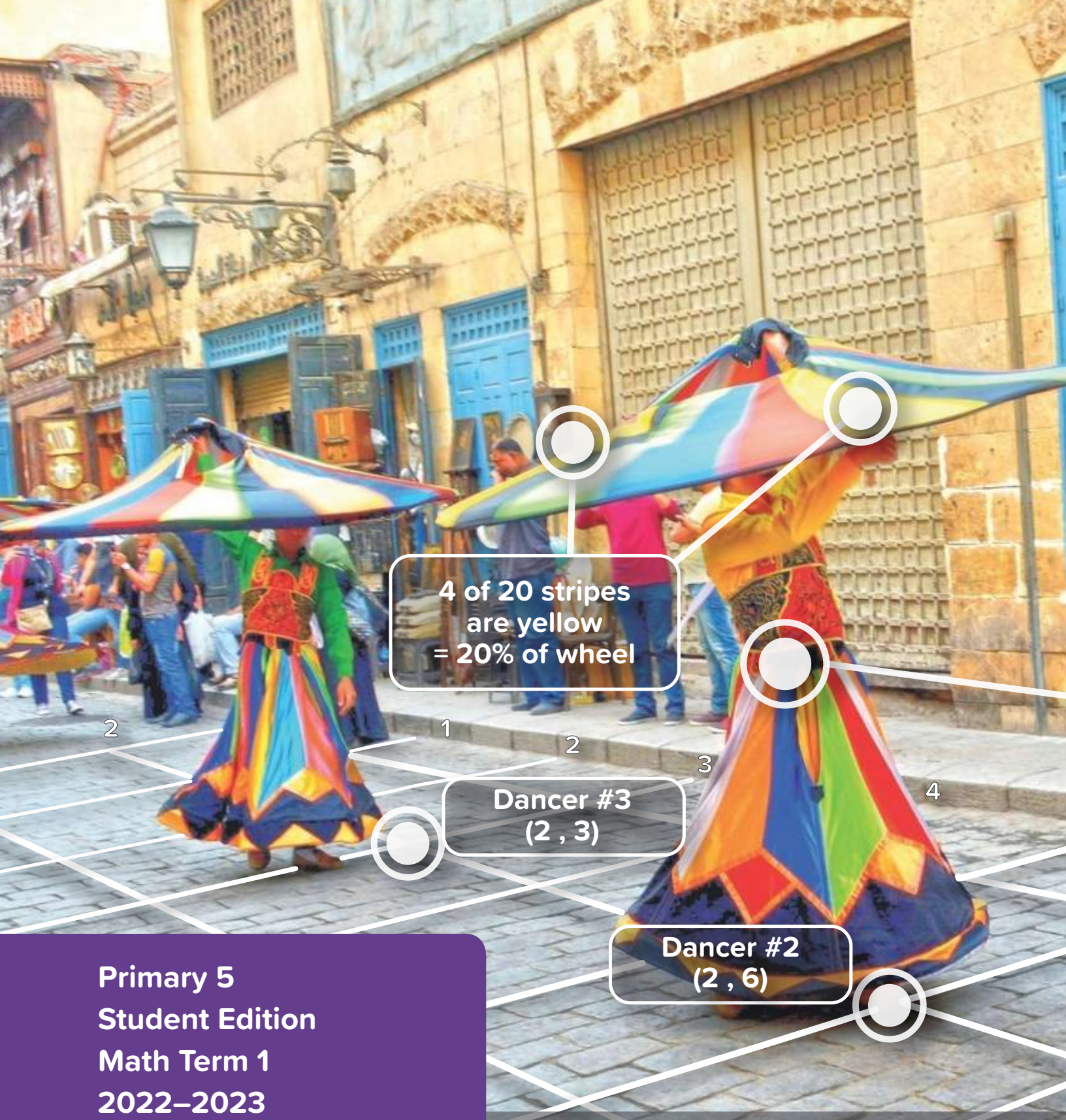
***x*-axis**
The horizontal axis on the coordinate plane.

***x*-coordinate**
The first number in an ordered pair; tells whether to move right or left along the *x*-axis of the coordinate plane.

Y

***y*-axis**
The vertical axis on the coordinate plane.

***y*-coordinate**
The second number in an ordered pair; tells whether to move up or down along the *y*-axis of the coordinate plane.



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